

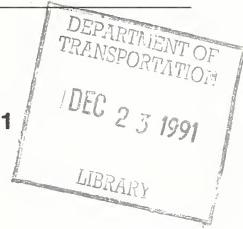
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US Department
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**National Highway
Traffic Safety
Administration**

DOT HS 807 760
Final Report

June 1991



Evaluation of the Biosid Dummy MDB-to-Car Left Side Impact Test of a 27° Crabbed Moving Deformable Barrier into a Minicars RSV 3-Door Hatchback at 39.0 MPH

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Technical Report Documentation Page

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16. Abstract This test report documents a crash test to evaluate the response of Side Impact dummies in a moving deformable barrier into stationary vehicle left side impact crash test at an impact velocity in excess of the FMVSS 214 specifications. This test was conducted on a Minicars RSV 3-door hatchback at the TRC Crash Test Facility, East Liberty, Ohio. The test vehicle was impacted on the left side by a moving deformable barrier, crabbed to 27°, at 39.0 mph. The test was a simulation of a 90° intersection collision with the striking vehicle travelling 35 mph and the struck vehicle travelling at 17.5 mph. Occupant responses of two side impact dummies were measured. One Biosid dummy was located in the driver's designated seating position and one Part 572 F dummy was located in the left rear seating position. The test date was May 20, 1991, and the ambient temperature was 78° F.																																					
<table><thead><tr><th style="text-align: center;">DRIVER</th><th style="text-align: center;">PASSENGER</th></tr></thead><tbody><tr><td>Head Injury Criteria (HIC)</td><td>162</td></tr><tr><td>Upper Spine Acceleration, g</td><td>43</td></tr><tr><td>Left Upper Rib Acceleration, g</td><td>87</td></tr><tr><td>Left Center Rib Acceleration, g</td><td>107</td></tr><tr><td>Left Lower Rib Acceleration, g</td><td>132</td></tr><tr><td>Lower Spine Acceleration, g</td><td>61</td></tr><tr><td>Thoracic Trauma Index (TTI(d))</td><td>96</td></tr><tr><td>Pelvis Acceleration, g</td><td>63</td></tr><tr><td></td><td>1012</td></tr><tr><td></td><td>120</td></tr><tr><td></td><td>92</td></tr><tr><td></td><td>NA</td></tr><tr><td></td><td>119</td></tr><tr><td></td><td>106</td></tr><tr><td></td><td>113</td></tr><tr><td></td><td>114</td></tr></tbody></table>				DRIVER	PASSENGER	Head Injury Criteria (HIC)	162	Upper Spine Acceleration, g	43	Left Upper Rib Acceleration, g	87	Left Center Rib Acceleration, g	107	Left Lower Rib Acceleration, g	132	Lower Spine Acceleration, g	61	Thoracic Trauma Index (TTI(d))	96	Pelvis Acceleration, g	63		1012		120		92		NA		119		106		113		114
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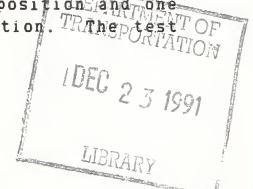


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SECTION 1.0

PURPOSE AND TEST SUMMARY

PURPOSE

The purpose of this test was to evaluate the response of side impact dummies in a moving deformable barrier into stationary vehicle left side impact test at an impact velocity in excess of the FMVSS 214 specifications. The vehicle was tested using conditions specified in FMVSS 214, Docket No. 88-06, Notice 8 final rule with the exception of the higher impact velocity.

INTRODUCTION

A stationary Minicars RSV 3-door hatchback was impacted on the left side by a Moving Deformable Barrier (MDB) on May 20, 1991. The test was to simulate an intersection collision with the striking vehicle travelling at 35 mph and the struck vehicle travelling at 17.5 mph. The orientation angle of the striking vehicle was 90° counterclockwise with respect to the longitudinal axis of the struck vehicle. The leading edge of contact was to be 37 inches forward of the midpoint of the wheelbase.

To simulate this collision, the MDB was to be towed into the stationary Minicars RSV at 39.1 mph with the MDB's wheels crabbed clockwise to 27°. The actual test speed was 39.0 mph and the actual leading edge of contact was 36.5 inches forward of the midpoint of the Minicars RSV's wheelbase.

One (1) BIOSID dummy was located in the Minicars RSV driver's designated seating position and one (1) Part 572 F dummy was located in the left rear designated seating position.

Section 2.0 contains General Test and Vehicle Parameter Data. Section 3.0 contains dummy, vehicle, and moving deformable barrier data. Appendix A contains pre-test and post-test vehicle and dummy photographs. Appendix B contains Data Plots. Appendix C contains Dummy Certification Data. Appendix D contains Miscellaneous Information.

SECTION 2.0

GENERAL TEST AND VEHICLE PARAMETER DATA

TEST RESULTS SUMMARY

This moving barrier side impact test was conducted at TRC on May 20, 1991.

The test vehicle, a Minicars RSV 3-door hatchback, was equipped with a 4 cylinder, transverse engine, and manual transmission. The vehicle's test weight was 3101 pounds. The vehicle's maximum crush was 14.0 inches.

The moving deformable barrier's speed was 39.0 mph at impact. The moving barrier's test weight was 3004 pounds.

The driver's Head Injury Criteria (HIC) was 162. The driver's Thoracic Trauma Index (TTI(d)) was 96.

The left rear passenger's HIC was 1012. The left rear passenger's Thoracic Trauma Index (TTI(d)) was 113.

TEST VEHICLE INFORMATION

VEHICLE MANUFACTURER: Minicars

MAKE/MODEL: RSV **VIN:** MIRS3SSH9M0M5012

BODY STYLE: 3-door hatchback MODEL YEAR: NA

COLOR: Silver

ENGINE DATA: TYPE: transverse CYLINDERS: 4 DISPLACEMENT: NA

TRANSMISSION DATA: 5 SPEED, X MANUAL, AUTOMATIC, FWD, X RWD, 4WD

DATE VEHICLE RECEIVED: 05/13/91 ODOMETER READING: 314.0

DEALER'S NAME AND ADDRESS: NA

ACCESSORIES:

POWER STEERING	No	AUTOMATIC TRANSMISSION	No
POWER BRAKES	No	AUTOMATIC SPEED CONTROL	No
POWER SEATS	No	TILTING STEERING WHEEL	No
POWER WINDOWS	No	TELESCOPING STEERING WHEEL	No
TINTED GLASS	No	AIR CONDITIONING	Yes
RADIO	No	ANTI-SKID BRAKE	No
CLOCK	No	REAR WINDOW DEFROSTER	No
OTHER	None		

REMARKS:

1. IS THE VEHICLE STOCK THROUGHOUT? Yes
 2. DOES VEHICLE SHOW EVIDENCE OF PRIOR ACCIDENT HISTORY? No
 3. DOES VEHICLE SHOW ANY SIGNIFICANT CORROSION? No
 4. CONDITION OF THE FRONT/REAR BUMPER AND FRAME: Good

CERTIFICATION DATA FROM VEHICLE'S LABEL: *

VEHICLE MANUFACTURED BY:

DATE OF MANUFACTURE: VIN:

GVWR: **LBS**

GAWR: FRONT: LBS., REAR: LBS.

*The vehicle did not contain a label stating certification data.

TEST VEHICLE INFORMATION CONT'D

TIRES ON VEHICLE (MFR., LINE, SIZE): Dunlop/Denovo 2/Run Flat/ PCL
200/65HR370

TIRE PRESSURE WITH MAXIMUM CAPACITY VEHICLE LOAD: FRONT: 32 PSI
REAR: 32 PSI

SPARE TIRE (MFR., LINE, SIZE): None

TYPE OF SEATS: FRONT: Bucket
REAR: Bench

TYPE OF FRONT SEAT BACKS: Non-adjustable

MAXIMUM WIDTH: 71.1 INCHES

WHEELBASE: 104.8 INCHES

LOCATION OF LABEL STATING TIRE & CAPACITY DATA: *

TIRE & CAPACITY DATA FROM VEHICLE'S LABEL: *

RECOMMENDED TIRE SIZE:

RECOMMENDED COLD TIRE PRESSURE: FRONT: _____ PSI; REAR: _____ PSI

DESIGNATED SEATING CAPACITY: ____FRONT ____REAR ____TOTAL

VEHICLE CAPACITY WEIGHT: _____ LBS.

TEST VEHICLE ATTITUDE (ALL MEASUREMENTS ARE IN INCHES):

DELIVERED ATTITUDE: LF 28.6; RF 28.8; LR 28.9; RR 28.9

FULLY LOADED ATTITUDE: LF 29.2; RF 28.9; LR 30.0; RR 29.7

PRE-TEST ATTITUDE: LF 28.6; RF 29.0; LR 28.8; RR 29.2

POST-TEST ATTITUDE: LF 28.0; RF 28.5; LR 29.4; RR 28.4

*The vehicle did not contain a label stating tire and capacity data.

TEST VEHICLE INFORMATION CONT'D

WEIGHT OF TEST VEHICLE AS RECEIVED (WITH MAXIMUM FLUIDS):

RIGHT FRONT	564 LBS.	RIGHT REAR 750 LBS.
LEFT FRONT	600 LBS.	LEFT REAR 732 LBS.
TOTAL FRONT WEIGHT	1164 LBS.	(44.0% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT	1482 LBS.	(56.0% OF TOTAL VEHICLE WEIGHT)
TOTAL DELIVERED WEIGHT 2646 LBS.		

CALCULATION OF TEST VEHICLE'S TARGET TEST WEIGHT:

RCLW = RATED CARGO AND LUGGAGE WEIGHT*

UDW = UNLOADED DELIVERED WEIGHT (2646 LBS)

VCW = VEHICLE CAPACITY WEIGHT (NA)

DSC = DESIGNATED SEATING CAPACITY (NA)

RCLW* = VCW - 150 (DSC) = 120 LBS.

TARGET TEST WEIGHT = UDW + RCLW* + (NO. OF SIDE IMPACT DUMMIES X 174 LBS/DUMMY)

TARGET TEST WEIGHT = 2646 + 348 + 120 **

TARGET TEST WEIGHT = 3114 LBS

WEIGHT OF TEST VEHICLE WITH REQUIRED DUMMIES AND 107 LBS. OF CARGO WEIGHT:

RIGHT FRONT	677 LBS.	RIGHT REAR 812 LBS.
LEFT FRONT	729 LBS.	LEFT REAR 883 LBS.
TOTAL FRONT WEIGHT	1406 LBS.	(45.3% OF TOTAL VEHICLE WEIGHT)
TOTAL REAR WEIGHT	1695 LBS.	(54.7% OF TOTAL VEHICLE WEIGHT)
TOTAL TEST WEIGHT	3101 LBS.	(0.4% UNDER TARGET TEST WEIGHT)

WEIGHT OF BALLAST SECURED IN VEHICLE CARGO AREA: 50 LBS.

COMPONENTS REMOVED TO MEET TARGET TEST WEIGHT: None

CG = 57.3 INCHES REARWARD OF FRONT WHEEL CENTERLINE

*Cargo weight for multi-purpose passenger vehicles, trucks, and buses is the vehicle's rated cargo and luggage weight from the vehicle's label or 300 pounds, whichever is less.

**A cargo weight of 120 pounds was provided by NHTSA.

POST-IMPACT DATA

TEST NUMBER: 910520

TEST DATE: 05/20/91

TEST TIME: 1516

TEST TYPE: Left side impact

IMPACT ANGLE: 270°

AMBIENT TEMPERATURE AT IMPACT AREA:

78° F

TEMPERATURE IN OCCUPANT COMPARTMENT:

78° F

IMPACT VELOCITY: PRIMARY = 39.0 MPH

SECONDARY = 39.2 MPH

DISTANCE FROM BARRIER TO VEHICLE: ENTERING VELOCITY TRAP = 26.0 IN.

EXITING VELOCITY TRAP = 2.0 IN.

TEST CONDITIONS

TEST NUMBER: 910520

DATE OF TEST: 05/20/91

TIME OF TEST: 1516

WIND VELOCITY: 2-4 mph @ 120° E

HUMIDITY: 60%

AMBIENT TEMPERATURE AT IMPACT AREA: 78° F

TEMPERATURE IN OCCUPANT COMPARTMENT: 78° F

SUBJECT VEHICLE DATA

	<u>ACTUAL</u>	<u>INTENDED</u>
SUBJECT VEHICLE TEST WEIGHT (lbs.)	3101	3114
MDB TEST WEIGHT (lbs.)	3004	3000
MDB VELOCITY (mph)*	39.0	39.1
IMPACT POINT (in.)**:	36.5	37.0

DUMMIES

	MIDDLE DRIVER	RT. FRONT PASSENGER	LEFT REAR PASSENGER	RT. REAR PASSENGER
TYPE:	BIOSID			SID
SERIAL NO.:	002			905
INSTRUMENTATION:				
HEAD ACCEL.:	3			3
UPPER SPINE ACCEL.:	4			3
UPPER RIB ACCEL.:	2			2
CENTER RIB ACCEL.:	2			
LOWER RIB ACCEL.:	2			2
LOWER SPINE ACCEL.:	4			4
UPPER ABDOMEN RIB ACCEL.:	1			
LOWER ABDOMEN RIB ACCEL.:	1			
ABDOMEN DISPLACEMENT:	2			
PELVIS ACCEL.:	3			3
RIB DISPLACEMENT:	3			1
SHOULDER ACCELS.:	1			
SHOULDER DISPLACEMENT:	1			

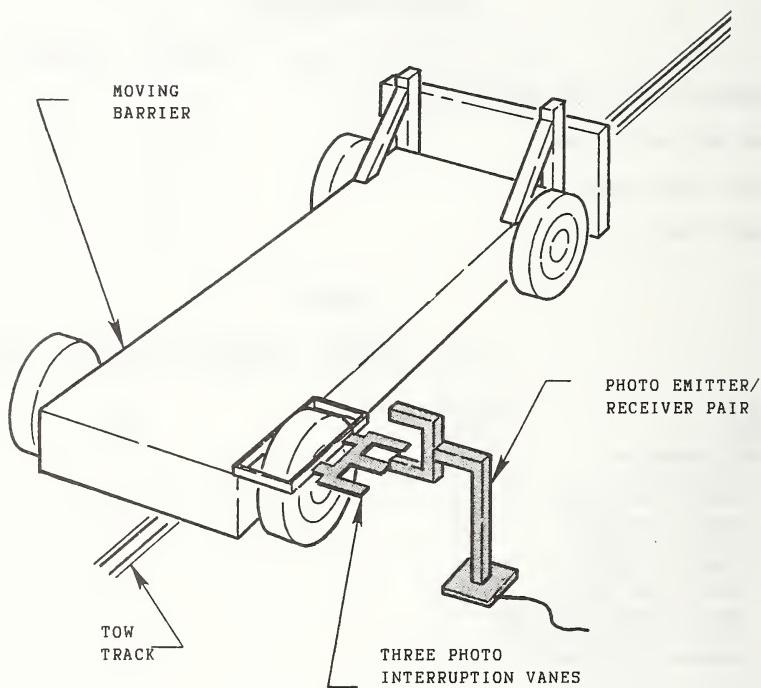
RESTRAINT SYSTEM: DRIVER'S AIRBAG THREE-POINT UNIBELT

REMARKS:

*AS MEASURED OVER FINAL ONE FOOT OF TRAVEL.

**AS MEASURED FORWARD OF THE SUBJECT VEHICLE'S WHEELBASE MIDPOINT.

IMPACT VELOCITY MEASUREMENT SYSTEM



The final vane clears emitter/receiver two inches before impact.

The vanes have one foot spacing.

SECTION 3.0

DUMMY, VEHICLE, AND MOVING DEFORMABLE BARRIER DATA

DUMMY DATA SUMMARY

TEST NUMBER 910520

DRIVER DUMMY

SN: 002

	POSITIVE DIRECTION MAX	MSEC	NEGATIVE DIRECTION MAX	MSEC
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HEAD

LONGITUDINAL ACCEL. (g)	29.7	234.5	11.5	56.5
LATERAL ACCEL. (g)	23.3	69.6	12.1	174.0
VERTICAL ACCEL. (g)	6.8	22.4	40.1	51.3
RESULTANT ACCEL. (g)	43.7	51.3		
HIC	162 FROM 37.0 TO 73.0			

LEFT SHOULDER

LATERAL ACCEL. (g)	55.1	35.0	21.5	63.1
DELTA V (MPH)	26.7	61.1		
LATERAL DISPL. (in)	1.2	41.4	0.0	93.1

UPPER SPINE

LONGITUDINAL ACCEL. (g)	6.3	68.8	7.8	80.0
LATERAL (P) ACCEL. (g)	42.7	36.3	7.3	68.8
DELTA V (MPH)	25.0	55.2		
LATERAL (R) ACCEL. (g)	42.3	35.6	7.3	68.1
DELTA V (MPH)	24.0	55.8		
VERTICAL ACCEL. (g)	6.4	38.8	6.3	69.4
RESULTANT (P) ACCEL. (g)	43.1	36.3		
RESULTANT (R) ACCEL. (g)	42.6	35.6		

LEFT UPPER THORAX RIB

LATERAL (P) ACCEL. (g)	87.0	31.9	10.6	80.6
DELTA V (MPH)	27.8	75.2		
LATERAL (R) ACCEL. (g)	89.1	31.3	9.9	80.0
DELTA V (MPH)	27.7	75.1		
LATERAL DISPL. (in)	1.2	42.8	0.0	155.1

LEFT CENTER THORAX RIB

LATERAL (P) ACCEL. (g)	107.1	31.3	11.6	72.5
DELTA V (MPH)	28.7	69.1		
LATERAL (R) ACCEL. (g)	111.8	31.3	12.3	72.5
DELTA V (MPH)	29.4	68.9		
LATERAL DISPL. (in)	1.3	43.0	0.0	229.9

LEFT LOWER THORAX RIB

LATERAL (P) ACCEL. (g)	131.7	31.9	15.3	70.6
DELTA V (MPH)	30.7	67.5		
LATERAL (R) ACCEL. (g)	131.4	31.9	16.3	70.6
DELTA V (MPH)	31.5	67.4		
LATERAL DISPL. (in)	1.4	42.9	0.0	66.0

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 910520

DRIVER DUMMY

SN: 002

POSITIVE DIRECTION	NEGATIVE DIRECTION		
MAX	MSEC	MAX	MSEC

THORACIC TRAUMA INDEX

TTI (P)	96.1
TTI (R)	96.6

LOWER SPINE

LONGITUDINAL ACCEL. (g)	14.5	32.5	7.9	48.8
LATERAL (P) ACCEL. (g)	60.5	39.4	9.6	93.8
DELTA V (MPH)	26.0	55.0		
LATERAL (R) ACCEL. (g)	61.7	39.4	8.8	90.6
DELTA V (MPH)	26.3	54.1		
VERTICAL ACCEL. (g)	20.6	39.4	5.4	63.1
RESULTANT (P) ACCEL. (g)	63.9	39.4		
RESULTANT (R) ACCEL. (g)	65.0	39.4		

LEFT UPPER ABDOMEN

LATERAL ACCEL. (g)	127.9	26.9	22.7	40.6
DELTA V (MPH)	30.4	68.1		
LATERAL DISPL. (in)	2.1	42.6	0.0	12.4

LEFT LOWER ABDOMEN

LATERAL ACCEL. (g)	103.9	21.3	25.9	41.2
DELTA V (MPH)	32.7	68.5		
LATERAL DISPL. (in)	2.7	42.5	0.1	97.0

PELVIS

LONGITUDINAL ACCEL. (g)	4.5	44.4	18.2	39.4
LATERAL ACCEL. (g)	63.4	34.4	6.5	160.6
DELTA V (MPH)	28.5	68.1		
VERTICAL ACCEL. (g)	6.3	51.3	8.9	40.6
RESULTANT ACCEL. (g)	63.6	34.4		

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD

NOTES:

For dummy channels Delta V is the velocity change at the approximate time of separation from the contact area.

(P) Primary Sensor
 (R) Redundant Sensor

DUMMY DATA SUMMARY

TEST NUMBER 910520

PASSENGER DUMMY

SN: 905

POSITIVE DIRECTION		NEGATIVE DIRECTION	
MAX	MSEC	MAX	MSEC

HEAD

LONGITUDINAL ACCEL. (g)	9.4	32.8	21.9	46.4
LATERAL ACCEL. (g)	159.8	43.3	12.7	175.5
VERTICAL ACCEL. (g)	56.7	48.1	45.8	42.4
RESULTANT ACCEL. (g)	161.6	43.3		
HIC		1012	FROM 41.6 TO 50.4	

UPPER SPINE

LONGITUDINAL ACCEL. (g)	11.4	69.4	25.8	37.5
LATERAL ACCEL. (g)	120.4	40.6	22.6	65.0
DELTA V (MPH)	29.4	56.8		
VERTICAL ACCEL. (g)	6.2	68.8	18.7	36.9
RESULTANT ACCEL. (g)	122.3	40.6		

LEFT UPPER THORAX RIB

LATERAL (P) ACCEL. (g)	91.9	30.0	13.2	108.1
DELTA V (MPH)	28.1	78.9		
LATERAL (R) ACCEL. (g)	92.1	30.0	13.7	108.1
DELTA V (MPH)	27.6	68.2		

LEFT LOWER THORAX RIB

LATERAL (P) ACCEL. (g)	119.2	28.1	25.3	55.6
DELTA V (MPH)	28.0	51.6		
LATERAL (R) ACCEL. (g)	114.9	28.1	25.3	55.6
DELTA V (MPH)	28.1	51.6		

THORACIC TRAUMA INDEX

TTI (P)	112.6
TTI (R)	110.7

LOWER SPINE

LONGITUDINAL ACCEL. (g)	11.3	48.8	32.8	33.1
LATERAL (P) ACCEL. (g)	106.0	34.4	28.9	58.8
DELTA V (MPH)	32.6	49.9		
LATERAL (R) ACCEL. (g)	106.5	34.4	28.6	58.8
DELTA V (MPH)	32.4	49.8		
VERTICAL ACCEL. (g)	4.6	68.8	4.6	35.0
RESULTANT (P) ACCEL. (g)	110.5	34.4		
RESULTANT (R) ACCEL. (g)	111.0	33.7		

DUMMY DATA SUMMARY CONTINUED

TEST NUMBER 910520

PASSENGER DUMMY

SN: 905

POSITIVE DIRECTION	NEGATIVE DIRECTION
MAX MSEC	MAX MSEC

CHEST DISPLACEMENT

LATERAL (in)	1.8	57.1	0.0	170.0
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PELVIS

LONGITUDINAL ACCEL. (g)	8.9	85.0	30.1	35.0
LATERAL ACCEL. (g)	113.7	30.0	16.1	80.0
DELTA V (MPH)	30.4	53.8		
VERTICAL ACCEL. (g)	9.9	29.4	5.1	85.0
RESULTANT ACCEL. (g)	114.8	30.0		

POSITIVE DIRECTION

LONGITUDINAL: FORWARD
 LATERAL: RIGHTWARD
 VERTICAL: UPWARD

NEGATIVE DIRECTION

LONGITUDINAL: REARWARD
 LATERAL: LEFTWARD
 VERTICAL: DOWNWARD

NOTES:

For dummy channels Delta V is the velocity change at the approximate time of separation from the contact area.

(P) Primary Sensor
 (R) Redundant Sensor

POST-IMPACT DUMMY/VEHICLE DATA

VISIBLE DUMMY CONTACT POINTS:

	DRIVER #002	PASSENGER #905
HEAD	Left door inner panel & front headliner	B-pillar
CHEST	Left door inner panel	Left side panel
ABDOMEN	None	None
LEFT KNEE	Left door inner panel	Left side panel
RIGHT KNEE	None	None

DOOR OPENING:

	LEFT	RIGHT
FRONT	Tools required	Easy
REAR	NA	NA

SEAT MOVEMENT:

	SEAT BACK FAILURE	SEAT SHIFT
FRONT	None	None
REAR	None	None

GLAZING DAMAGE:

The left side door glass was cracked upon impact.
The left side of the windshield was cracked upon impact.

OTHER NOTABLE IMPACT EFFECTS:

None

DUMMY KINEMATIC SUMMARY

DRIVER DUMMY

Upon impact, the driver dummy's head rotated to the left, impacting the left inner door panel. The left side of the dummy's chest and the dummy's left leg contacted the left inner door panel. The dummy's head and upper torso rotated forward as the dummy rebounded toward the right. The dummy's head contacted the windshield headliner. The dummy came to rest in the center of the vehicle, leaning forward.

LEFT REAR PASSENGER DUMMY

Upon impact, the left rear passenger dummy's head rotated toward the left and contacted the B-pillar. The left side of the dummy's chest and the dummy's left leg contacted the left inner side panel. The dummy was restrained by the three-point unibelt. The dummy's head then rotated toward the right. The dummy came to rest seated in the left rear passenger's seat, restrained by the three-point unibelt.

DUMMY TEMPERATURE CONTROL AND POSITIONING

The vehicle was kept inside the temperature controlled crash test building until approximately 2 hours prior to the test. Temperatures inside the vehicle and ambient temperature at the crash area were recorded. Dummy temperature while outside the crash test building was maintained by shading the vehicle with tarps until approximately 1 minute prior to the test.

The following Side Impact Dummy Seating Procedure summarizes the steps taken to position the instrumented, calibrated dummies in the test vehicle.

SIDE IMPACT DUMMY SEATING PROCEDURE

1. SEAT POSITIONING

- A. Place seat at the longitudinal midpoint of fore to aft adjustment (forward most locking position to rear most locking position). If no locking position is available at mid-travel, use the position immediately rearward of mid-travel.
- B. If the seat back angle is adjustable, place it in the manufacturer's stated nominal design location. If not specified, set it at the first detent rearward of 25°.
- C. Adjustable head restraints are set so that the top surface of the restraint is level with the cg of the dummy's head.
- D. If the seat is equipped with adjustable side or lumbar supports, they are set in their "released" or full back positions.
- E. All other seat adjustments are positioned to their mid-travel locations. If locking positions are not available at these mid-points, use the position immediately rearward, down, left or clockwise of mid-travel. Clockwise is defined looking rear to front or left to right relative to the vehicle. This also applies to adjustable steering columns.

2. H-POINT DETERMINATION

- A. The SAE three-dimensional H-point machine (SAE J826 APR80 - 50th percentile male configuration) is used to locate the H-point for each surrogate.
- B. The H-point machine is positioned on the seat as follows:
 1. Bucket or Contoured Seats - The H-point machine is centered on the bucket or contour such that its midsagittal plane is vertical and longitudinal.

2. Bench Seats
 - a. Driver position. The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and contains the steering wheel center point.
 - b. Outboard passenger positions. The H-point machine is positioned such that its midsagittal plane is vertical, longitudinal, and the same distance from the longitudinal vehicle centerline as that for the driver position.
 - c. Center passenger positions. The H-point machine is positioned such that its midsagittal plane is vertical and contains the longitudinal vehicle centerline.
- C. Locate the H-point position using the steps outlined in sections 4 through 6 of SAE Standard J826 APR80, unless otherwise specified in section 1 or 2 of this document. Record the coordinates of this point, relative to the vehicle, for use in sections 3 and 4 of this document.

3. BIOSID DUMMY POSITIONING PROCEDURE

A. DRIVER

1. The upper torso of the dummy shall rest against the seat back. The midsagittal plane of the test dummy shall be (1) vertical, (2) parallel to the vehicle's longitudinal centerline, and (3) pass through the center of the steering wheel rim (bench seat) or coinciding with the longitudinal centerline of the bucket seat (bucket seat).
2. The inner surface of the lower end of the arm shall be in contact with the upper torso jacket of the dummy. The longitudinal centerline of the arm should be parallel to the coronal plane (y-z plane of the torso).
3. The "H" point of the dummy shall be positioned within one-half (0.5) inch (12.5 mm) of the required "H" point location as determined using the SAE J826 manikin.

4. The pelvic angle should be between 21 and 25 degrees from the horizontal, sloping upward toward the front of the vehicle. Note: The BIOSID uses the same pelvic angle gage as the Hybrid III-50th.
5. The dummy's upper legs should be positioned symmetrical about the midsagittal plane with a spacing between the knees of 10.3 inches (262 mm) measured from the outboard surface of the knee castings. If practical, both legs of the dummy should be in the vertical and longitudinal planes and the knees should be level.
6. The right foot of the dummy should rest on the accelerator with the heel resting as far forward as possible on the floorpan. The left foot should be set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel.

B. REAR PASSENGER

1. The upper torso of the dummy should rest against the seat back. The midsagittal plane of the dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as the midsagittal plane of the dummy in the driver position (bench seat), or coincides with the longitudinal centerline of the bucket seat (bucket seat). If this is not possible, then the dummy should be positioned so the outermost point of the skin of the upper torso just touches the innermost surface of the vehicle adjacent to the dummy.
2. The arm position shall be set in the same manner as with the driver.
3. The "H" point of the dummy shall be positioned within one-half (0.5) inch (12.5 mm) of the "H" point location as determined using the SAE J826 manikin.
4. The pelvic angle should be the same as that specified for the driver.
5. The upper legs should be set in the same manner as the driver.

4. POSITIONING PROCEDURE FOR THE PART 572 SUBPART F TEST DUMMY

A. Position a correctly configured test dummy, conforming to subpart F of Part 572, in the front outboard seating position on the side of the test vehicle to be struck by the moving deformable barrier and position another conforming test dummy in the rear outboard position on the same side of the vehicle. Each test dummy is restrained using all available belt systems in all seating positions where such belt restraints are provided. In addition, any folding armrest is retracted.

B. TORSO

1. FOR A TEST DUMMY IN THE DRIVER POSITION

- a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and passes through the center of the steering wheel.
- b. For a bucket seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.

2. FOR A TEST DUMMY IN THE FRONT OUTBOARD PASSENGER POSITION

- a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and the same distance from the vehicle's longitudinal centerline as would be the midsagittal plane of a test dummy positioned in the driver position under 4.B.1(a).

- b. For a bucket seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket seat.
3. FOR A TEST DUMMY IN EITHER OF THE REAR OUTBOARD PASSENGER POSITIONS
- a. For a bench seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and, if possible, the same distance from the vehicle's longitudinal centerline as the midsagittal plane of a test dummy positioned in the driver position under 4.B.1(a). If it is not possible to position the test dummy so that its midsagittal plane is parallel to the vehicle longitudinal centerline and is at this distance from the vehicle's longitudinal centerline, the test dummy is positioned so that some portion of the test dummy just touches, at or above the seat level, the side surface of the vehicle, such as the upper quarter panel, an armrest, or any interior trim (i.e., either the broad trim panel surface or a smaller, localized trim feature).
 - b. For a bucket or contoured seat. The upper torso of the test dummy rests against the seat back. The midsagittal plane of the test dummy is vertical and parallel to the vehicle's longitudinal centerline, and coincides with the longitudinal centerline of the bucket or contoured seat.

C. PELVIS

1. H-POINT

The H-points of each test dummy coincide within 1/2 inch in the vertical dimension and 1/2 inch in the horizontal dimension of a point 1/4 inch below the position of the H-point determined by using the equipment for the 50th percentile and procedures specified in SAE J826 (1980), except that Table 1 of SAE J826 is not applicable. The length of the lower leg and thigh segments of the H-point machine are adjusted to 16.3 and 15.8 inches, respectively.

2. PELVIC ANGLE

As determined using the pelvic angle gauge (GM drawing 78051-532 incorporated by reference in part 572, subpart E which is inserted into the H-point gauging hole of the dummy, the angle of the plane of the surface on the lumbar-pelvic adaptor on which the lumbar spine attaches is 23 to 25 degrees from the horizontal, sloping upward toward the front of the vehicle.

D. LEGS

1. FOR A TEST DUMMY IN THE DRIVER POSITION.

The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The left knee of the dummy is positioned such that the distance from the outer surface of the knee pivot bolt to the dummy's midsaggital plane is six inches. To the extent practicable, the left leg of the test dummy is in a vertical longitudinal plane.

2. FOR A TEST DUMMY IN THE OUTBOARD PASSENGER POSITIONS

The upper legs of each test dummy rest against the seat cushion to the extent permitted by placement of the feet. The initial distance between the outboard knee clevis flange surfaces is 11.5 inches. To the extent practicable, both legs of the test dummies in outboard passenger positions are in vertical longitudinal planes. Final adjustment to accommodate placement of feet in accordance with Section E for various passenger compartment configurations is permitted.

E. FEET

1. FOR A TEST DUMMY IN THE DRIVER POSITION

The right foot of the test dummy rests on the undepressed accelerator with the heel resting as far forward as possible on the floorpan. The left foot is set perpendicular to the lower leg with the heel resting on the floorpan in the same lateral line as the right heel.

2. FOR A TEST DUMMY IN THE FRONT OUTBOARD PASSENGER POSITION

The feet of the test dummy are placed on the vehicle's toeboard with the heels resting on the floorpan as close as possible to the intersection of the toeboard and floopan. If the feet cannot be placed flat on the toeboard, they are set perpendicular to the lower legs and placed as far forward as possible so that the heels rest on the floorpan.

3. FOR A TEST DUMMY IN EITHER OF THE REAR OUTBOARD PASSENGER POSITIONS

The feet of the test dummy are placed flat on the floorpan and beneath the front seat as far as possible without front seat interference. If necessary, the distance between the knees can be changed in order to place the feet beneath the seat.

5. FINAL POSITIONING

- A. Prior to conducting the test, the dummy position is visually checked. The dummy is to be properly positioned laterally with its midsaggital plane vertical and longitudinal, and the upper torso resting against the seat back. The H-point and pelvis angle are to be within the specified ranges and the foot, knee, and leg placements are to be as outlined. The COTR is to be satisfied with the final dummy position and any deviations from this procedure are to be approved by the COTR.
- B. The final dummy position is recorded. These measurements are to include, but not be limited to, pelvis and head angles as well as actual H-point and head cg locations relative to the vehicle. The straight-line distance from the H-point to the center of the outer ankle bolt is also recorded for one of the legs (eg. left H-point to left angle bolt).

DUMMY IN-VEHICLE POSITION RECORDING SHEET

MFR./MAKE/MODEL: Minicars/RSV/Pacer

SEAT TYPE: Bench

ADJUSTER TYPE: X Manual

X Bucket

Power

Split bench

Non-adjustable

TECHNICIANS:

BUCKET SEAT BACK TYPE: X Non-adjustable

1. R. Branham

Adjustable reclining

2. D. Carpenter

POSITIONING DATE: 05/20/91

3. P. Cummins

AMBIENT TEMP.: 78° F TIME: 1215

4. _____

DRIVER DUMMY* # 002 TYPE: BIOSID

Head -10°

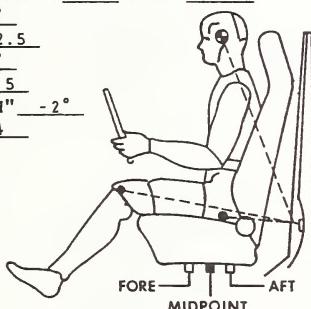
Target 5.5

Knee 108°

Joint 17.5

Approx. "H" -2°

Point 5.4



BACK SEAT DRIVER SIDE DUMMY** # 905 TYPE: 572F

Head 49°

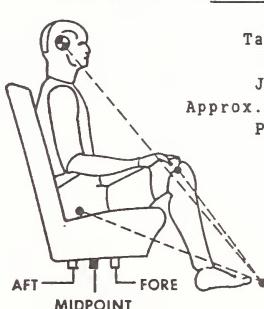
Target 48.4

Knee 53°

Joint 17.6

Approx. "H" 82°

Point 30.6

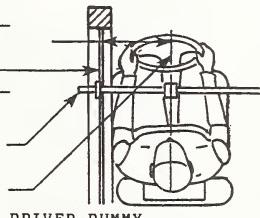


DOOR GLASS HEIGHT = 13.5

10.0

LATERAL BAR

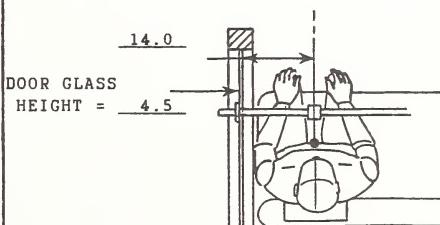
ADJUSTABLE
POTTER



DOOR GLASS HEIGHT = 4.5

14.0

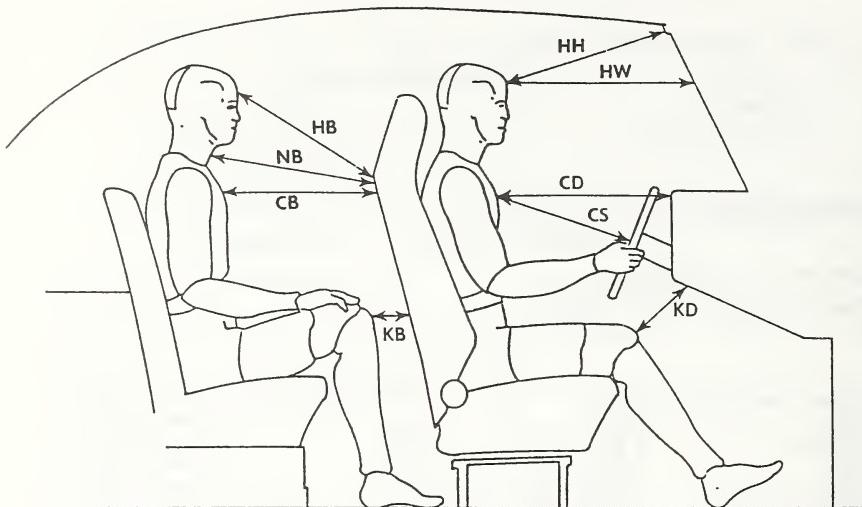
PASSENGER DUMMY



*Driver dummy measurements are referenced to top of striker bolt and all angles referenced to vertical.

**Passenger dummy measurements are referenced to front seat back latch bolt with front seat in mid-position and all angles are referenced to vertical.

DUMMY LONGITUDINAL CLEARANCE DIMENSIONS

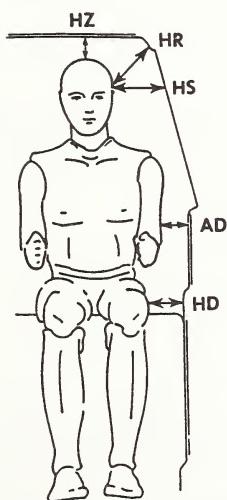
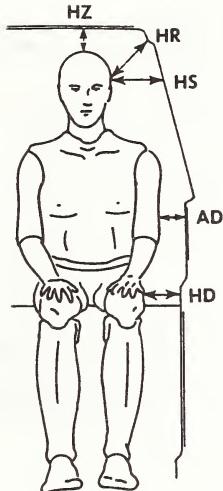


REAR DRIVER'S
DRIVER SIDE PASSENGER

HH	11.6	NA
HW	19.8	NA
CD	21.8	NA
CS	10.0	NA
KDL	1.9	NA
KDR	1.8	NA
HB	NA	22.1
NB	NA	20.6
CB	NA	16.9
KBL	NA	1.2
KBR	NA	1.5

ALL MEASUREMENTS ARE IN INCHES.

DUMMY LATERAL CLEARANCE DIMENSIONS



REAR DRIVER'S
DRIVER SIDE PASSENGER

HR	5.6	4.8
HS	9.4	6.8
AD	1.2	2.8
HD	2.5	4.1
HZ	1.5	1.9

ALL DISTANCE MEASUREMENTS ARE IN
INCHES.

SAE 3D H-POINT MACHINE LOCATION AND DUMMY LOCATION DATA

	DRIVER #002	PASSENGER #905
SAE 3D H-POINT MACHINE LOCATION:	X = -1.00 Z = 6.25	X = -24.00 Z = 3.85
DUMMY H-POINT LOCATION:	X = -0.50 Z = 6.35	X = -23.50 Z = 4.1
DUMMY PELVIC ANGLE:	21°	25°

The H-point location measurements are referenced to the left door lower center striker bolt in two-dimensional rectangular coordinates:

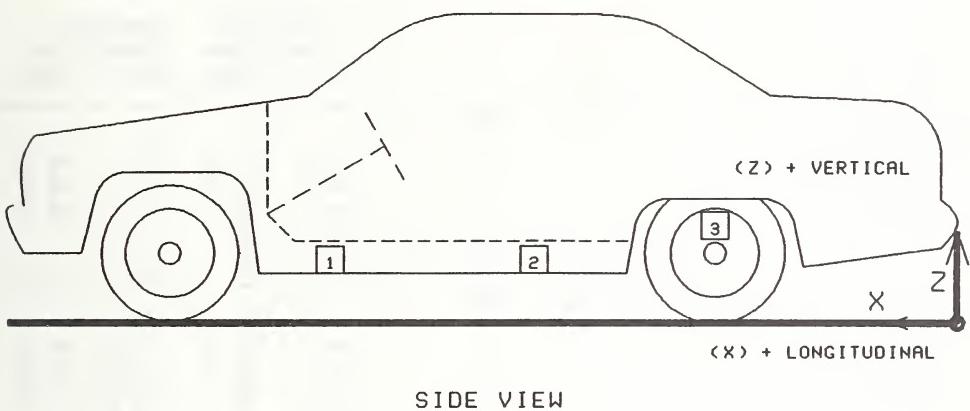
+X = Forward

+Z = Upward

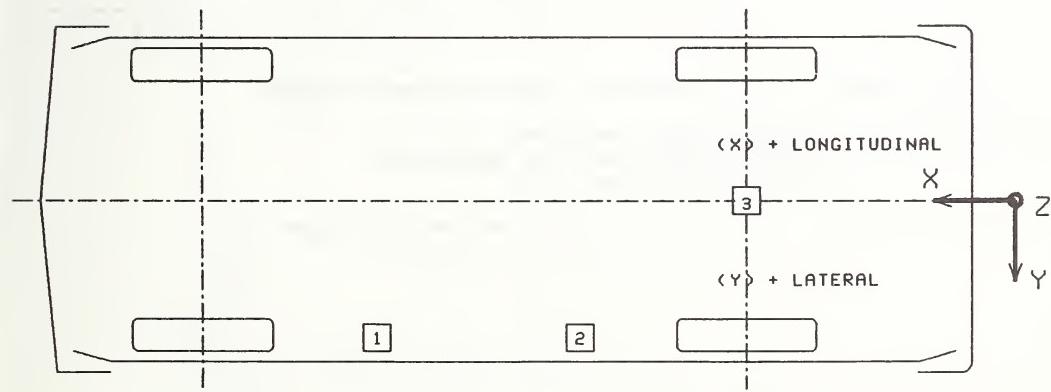
All dimensions are in inches except as noted.

Pelvis angles are referenced to horizontal, positive is upward toward the front of the vehicle.

VEHICLE ACCELEROMETER PLACEMENT



SIDE VIEW



BOTTOM VIEW

VEHICLE ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910520

No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	RIGHT SILL AT FRONT SEAT	101.9	22.6	14.8				
	LONGITUDINAL				2.5	11.5	7.5	18.0
	LATERAL				28.9	11.8	1.5	95.5
	VERTICAL				9.8	12.5	5.3	89.3
	RESULTANT				30.5	11.8		
	Delta VY is 18.6 MPH @ 93.4 MSEC							
2	RIGHT SILL AT REAR SEAT	60.6	22.4	14.2				
	LONGITUDINAL				4.1	89.0	7.4	16.9
	LATERAL				47.3	11.0	4.4	61.6
	VERTICAL				13.0	12.4	4.8	17.9
	RESULTANT				48.6	11.1		
	Delta VY is 17.3 MPH @ 58.6 MSEC							
3	REAR DECK OVER AXLE	32.8	-0.3	33.9				
	LONGITUDINAL				4.5	90.5	9.3	54.5
	LATERAL				30.3	11.1	1.8	149.1
	VERTICAL				7.6	34.9	14.1	21.9
	RESULTANT				31.3	11.1		
	Delta VY is 19.5 MPH @ 110.1 MSEC							

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR BUMPER
 Y: + RIGHTWARD FROM VEHICLE CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations are in inches.

**VEHICLE EXTERIOR PROFILES AND STATIC CRUSH
ZERO DISTANCE AT PROJECTED IMPACT POINT***

LOCATION	HEIGHT (IN)	PRE-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE**))										
		6	12	18	24	30	36	42	48	54	60	66
Axle Height	71.1;	TRACK:	61.8;	TOP WIDTH:	36.1;	LENGTH:	177.9;	WHEELBASE:	104.6	OVERHANG:	FRONT:	43.0;
H-point											REAR:	29.8
Mid Door	22.5	X	12.1	12.4	12.1	12.2	12.2	12.0	11.8	12.1	11.9	12.2
Window Sill	33.9	15.0	14.6	14.6	14.8	14.8	14.5	14.6	14.5	14.8	14.6	14.4
Window Top	54.2	X	X	X	X	X	X	30.9	30.8	30.7	30.6	30.5

POST-TEST PROFILE (DISTANCE IN INCHES FROM REFERENCE PLANE))**

LOCATION	HEIGHT (IN)	STATIC CRUSH (IN)											
		1.2	1.9	2.2	3.3	3.3	3.8	4.0	4.8	5.5	6.1	5.8	5.6
Axle Height	11.4	X	16.5	22.9	23.1	24.1	24.2	24.4	24.6	25.2	25.9	26.5	25.9
H-point	21.2	X	16.4	20.6	22.5	22.2	23.0	23.6	24.4	25.1	25.5	25.9	26.2
Mid Door	22.5	X	16.4	19.2	21.7	22.0	22.2	23.1	23.8	24.4	24.8	25.2	26.0
Window Sill	33.9	16.2	16.6	19.1	20.9	22.5	23.2	24.1	24.4	25.1	25.4	26.1	26.5
Window Top	54.2	X	X	X	X	X	X	30.8	31.2	30.5	32.0	32.2	32.5

LOCATION	HEIGHT (IN)	STATIC CRUSH (IN)											
		1.2	1.9	2.2	3.3	3.3	3.8	4.0	4.8	5.5	6.1	5.8	5.6
Axle Height	11.4	X	4.3	8.2	10.4	10.0	10.8	11.6	12.6	13.0	13.4	14.0	14.0
H-point	21.2	X	4.3	7.0	9.7	9.9	10.1	11.3	11.3	12.0	12.4	12.9	13.4
Mid Door	22.5	X	4.3	7.0	9.7	9.9	10.1	11.3	11.3	12.0	12.4	12.9	13.4
Window Sill	33.9	1.2	1.6	4.5	6.3	7.7	8.4	9.6	9.8	10.6	11.5	11.8	11.7
Window Top	54.2	X	X	X	X	X	X	-0.1	0.4	-0.2	1.4	1.6	2.0

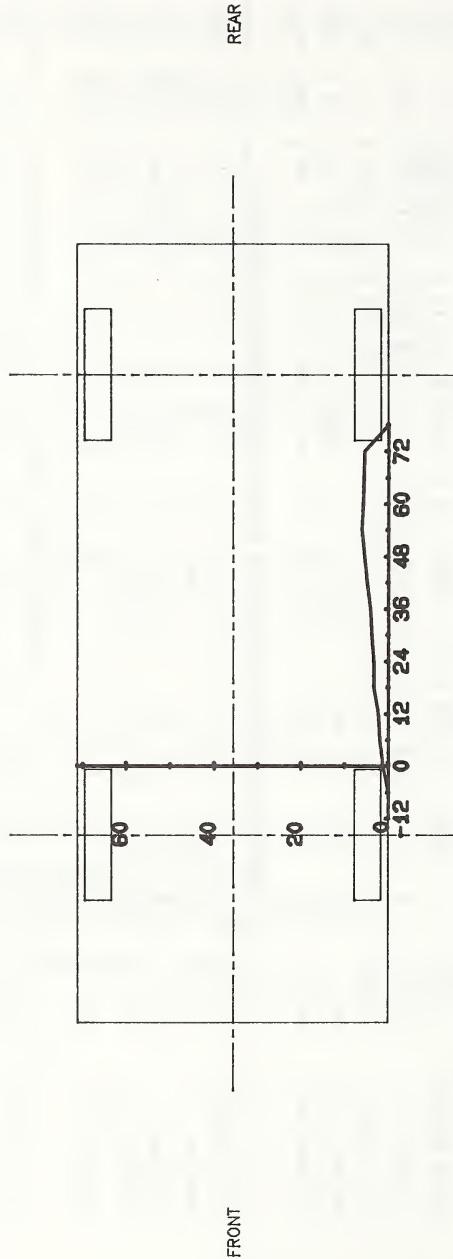
*Projected impact point is 37 inches forward of driver's side wheelbase midpoint.
Column readings are front to rear from left to right.

**Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

*Projected impact point is 37 inches forward of driver's side wheelbase midpoint.
Column readings are front to rear from left to right.

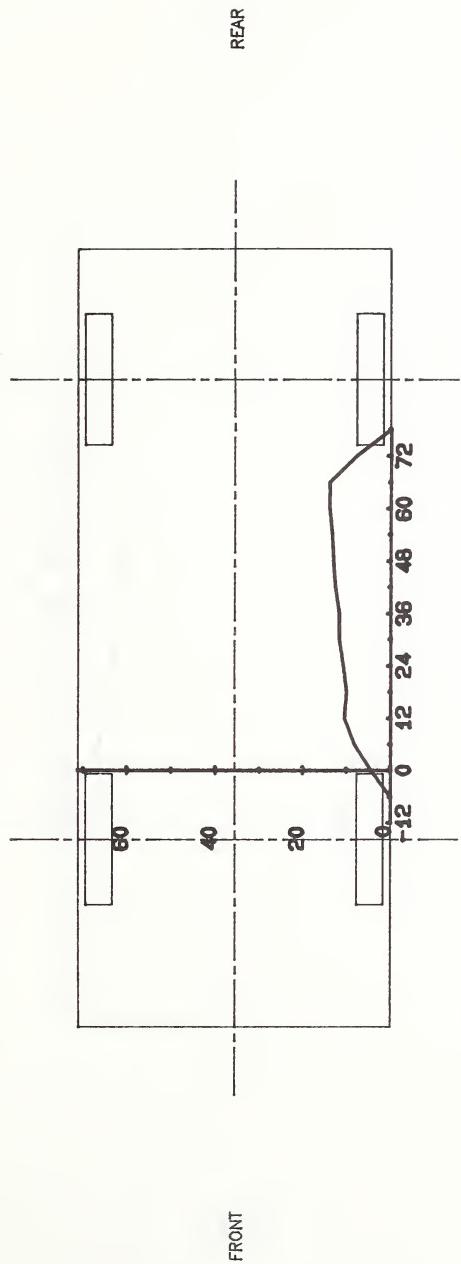
**Reference plane is parallel to and 48 inches from the vehicle longitudinal centerline.

VEHICLE EXTERIOR STATIC CRUSH PROFILE



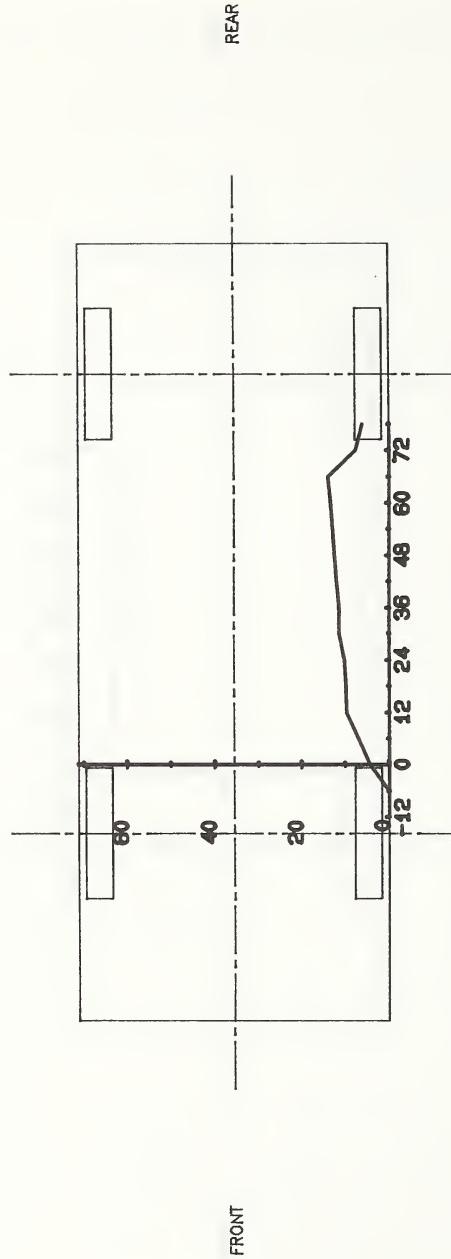
PROFILE LEVEL EQUALS AXLE HEIGHT WHICH IS 11.4" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.032

VEHICLE EXTERIOR STATIC CRUSH PROFILE



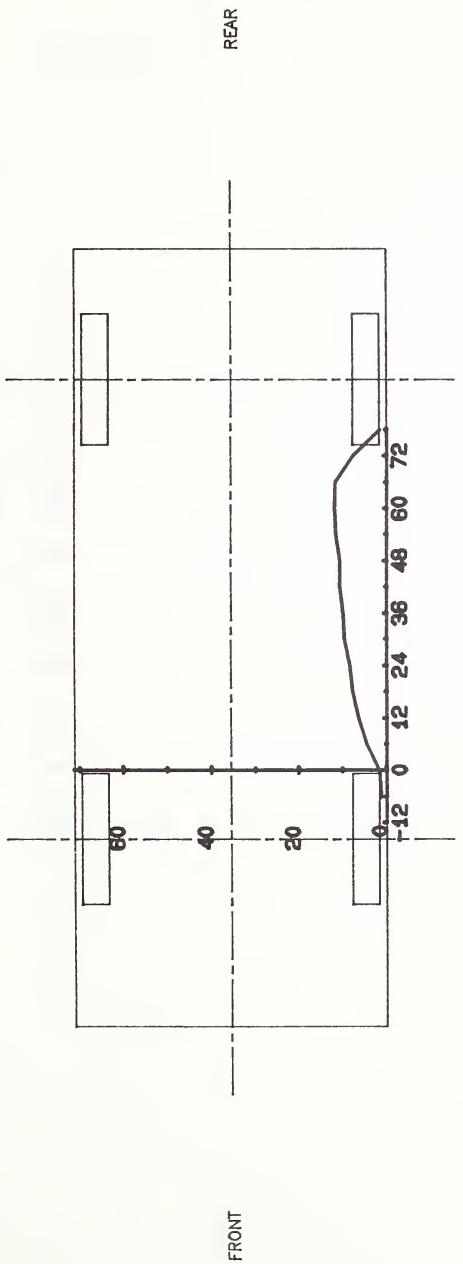
PROFILE LEVEL EQUALS H-POINT HEIGHT WHICH IS 21.2" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.032

VEHICLE EXTERIOR STATIC CRUSH PROFILE



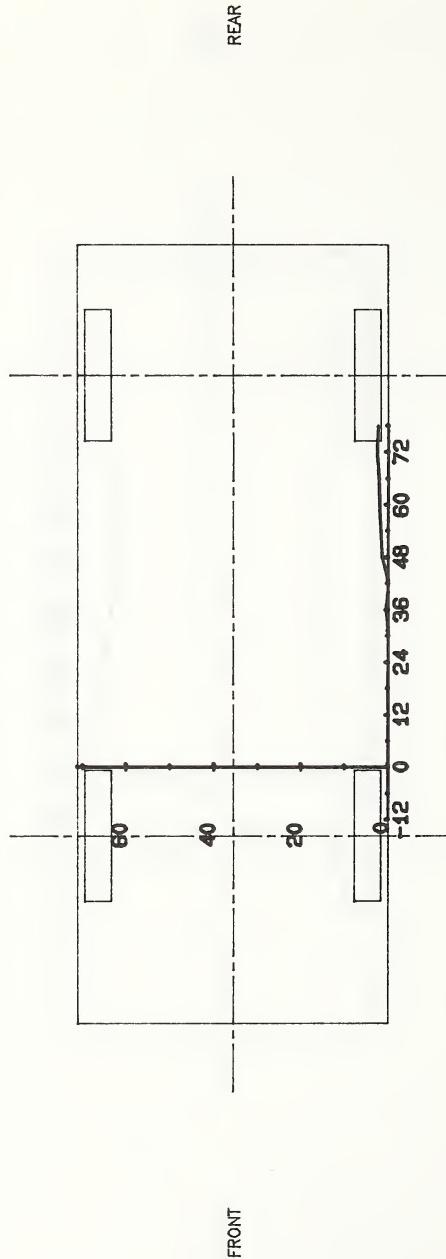
PROFILE LEVEL EQUALS MID DOOR HEIGHT WHICH IS 22.5" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.032

VEHICLE EXTERIOR STATIC CRUSH PROFILE



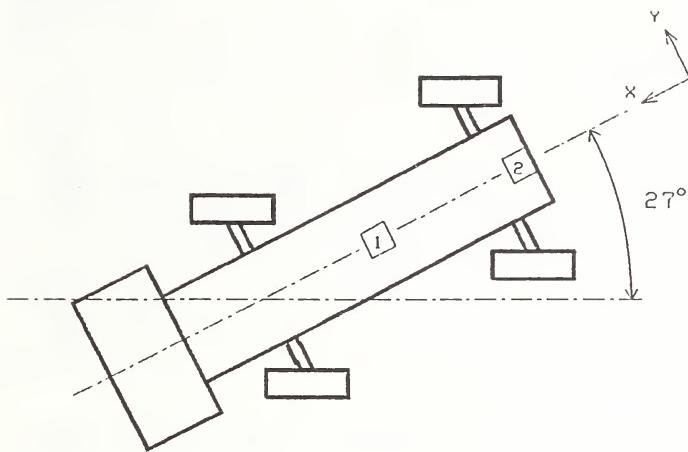
PROFILE LEVEL EQUALS WINDOW SILL HEIGHT WHICH IS 33.9" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.032

VEHICLE EXTERIOR STATIC CRUSH PROFILE



PROFILE LEVEL EQUALS WINDOW TOP HEIGHT WHICH IS 54.2" ABOVE GROUND LEVEL
(0,0) EQUALS PROJECTED IMPACT POINT
SCALE FACTOR EQUALS 0.032

MOVING BARRIER ACCELEROMETER PLACEMENT



MOVING BARRIER ACCELEROMETER LOCATIONS AND DATA SUMMARY

TEST NUMBER 910520

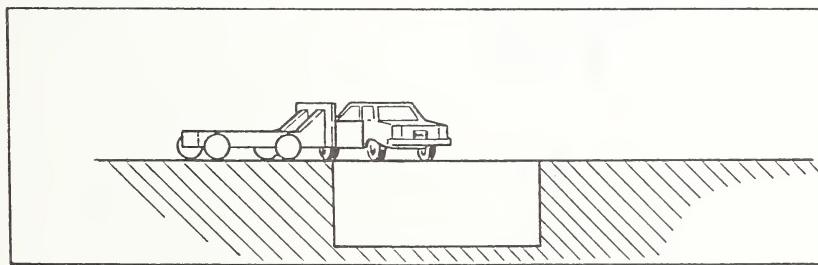
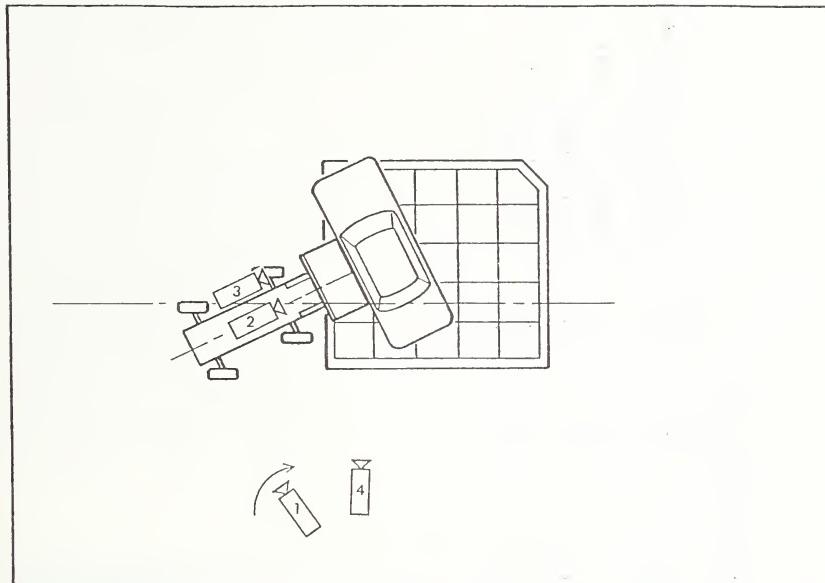
No.	LOCATION	X*	Y*	Z*	POSITIVE DIRECTION		NEGATIVE DIRECTION	
					MAX G	MSEC	MAX G	MSEC
1	CENTER OF GRAVITY	74.2	0.0	12.2				
	LONGITUDINAL				1.7	132.5	19.8	40.5
	LATERAL				2.6	114.6	7.8	19.8
	VERTICAL				6.1	32.4	4.4	22.9
	RESULTANT				20.4	40.4		
		Delta VX is -20.9 MPH @ 94.4 MSEC						
		Delta VY is -5.6 MPH @ 94.4 MSEC						
2	REAR FRAME MEMBER	0.0	0.0	24.0				
	LONGITUDINAL				2.9	121.0	20.1	32.9
	LATERAL				5.6	19.8	5.2	88.9
		Delta VX is -19.5 MPH @ 94.4 MSEC						
		Delta VY is 1.5 MPH @ 94.4 MSEC						

* ALL MEASUREMENTS OF ACCELEROMETER LOCATIONS ARE IN INCHES.

REFERENCE: X: + FORWARD FROM REAR POINT OF FRAME
 Y: + RIGHTWARD FROM BARRIER CENTERLINE
 Z: + UPWARD FROM GROUND LEVEL

All measurements of accelerometer locations in inches.

CAMERA POSITIONS



CAMERA INFORMATION

CAMERA NO.	LOCATION	TYPE	LENS (mm)	SPEED (fps)	PURPOSE OF CAMERA DATA
1	Right panning	Kodak	16	24	Real-time documentation
2	Onboard mov. bar. wide	Photosonic 1B	13	500	Impact point
3	Onboard mov. bar. tight	Photosonic 1B	25	498	Close-up of impact point
4	Right	Photosonic 1B	25	498	Overall view

APPENDIX A

PHOTOGRAPHS



Figure A-1. PRE-TEST VEHICLE FRONT AND BARRIER VIEW



Figure A-2. POST-TEST VEHICLE FRONT AND BARRIER VIEW



Figure A-3. PRE-TEST VEHICLE RIGHT SIDE VIEW

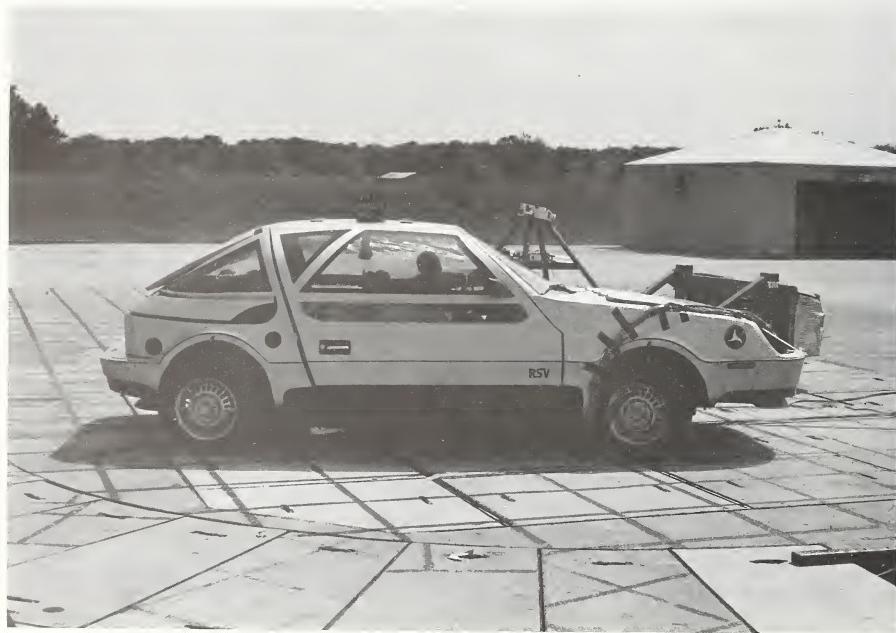


Figure A-4. POST-TEST VEHICLE RIGHT SIDE AND BARRIER VIEW



Figure A-5. PRE-TEST VEHICLE REAR AND BARRIER VIEW



Figure A-6. POST-TEST VEHICLE REAR AND BARRIER VIEW



Figure A-7. PRE-TEST VEHICLE LEFT SIDE AND BARRIER VIEW



Figure A-8. POST-TEST VEHICLE LEFT SIDE AND BARRIER VIEW



Figure A-9. PRE-TEST VEHICLE LEFT SIDE VIEW



Figure A-10. POST-TEST VEHICLE LEFT SIDE VIEW



Figure A-11. POST-TEST VEHICLE LEFT SIDE CLOSE-UP VIEW



Figure A-12. PRE-TEST VEHICLE RIGHT FRONT VIEW



Figure A-13. POST-TEST VEHICLE RIGHT FRONT VIEW



Figure A-14. PRE-TEST VEHICLE LEFT REAR VIEW



Figure A-15. PRE-TEST VEHICLE LEFT REAR CLOSE-UP VIEW



Figure A-16. POST-TEST VEHICLE LEFT FRONT AND BARRIER VIEW

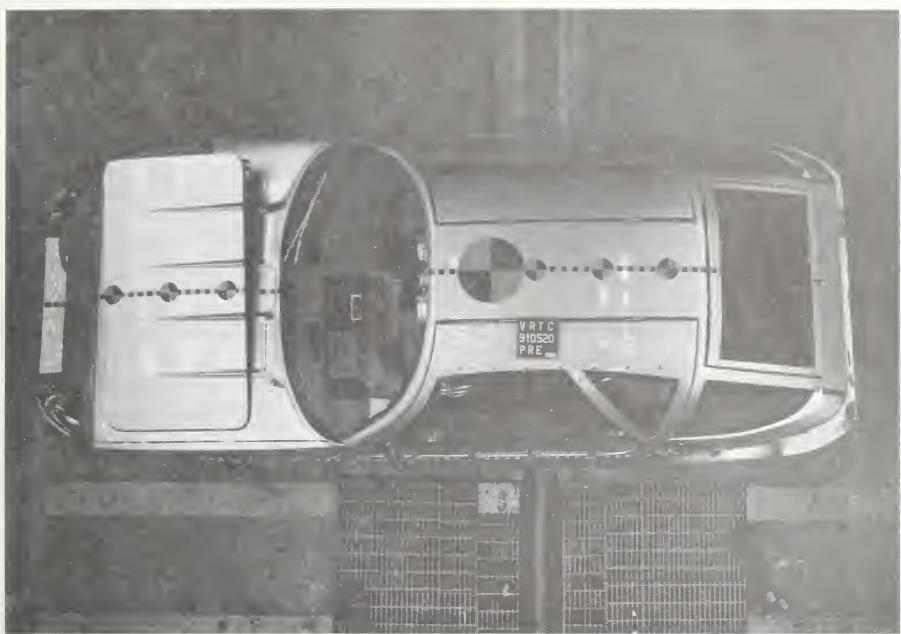


Figure A-17. PRE-TEST VEHICLE TOP - VIEW 1

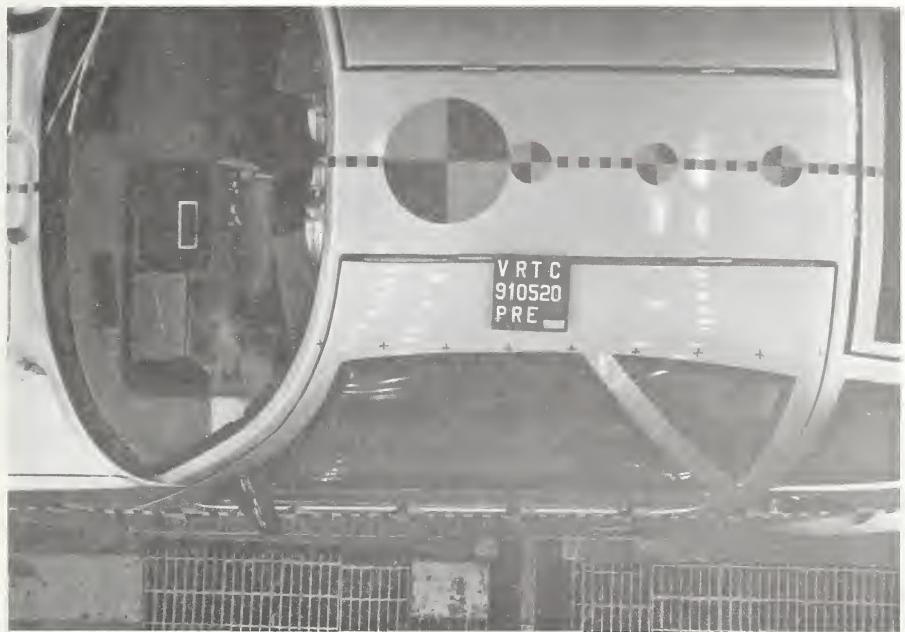


Figure A-18. PRE-TEST VEHICLE TOP - VIEW 2

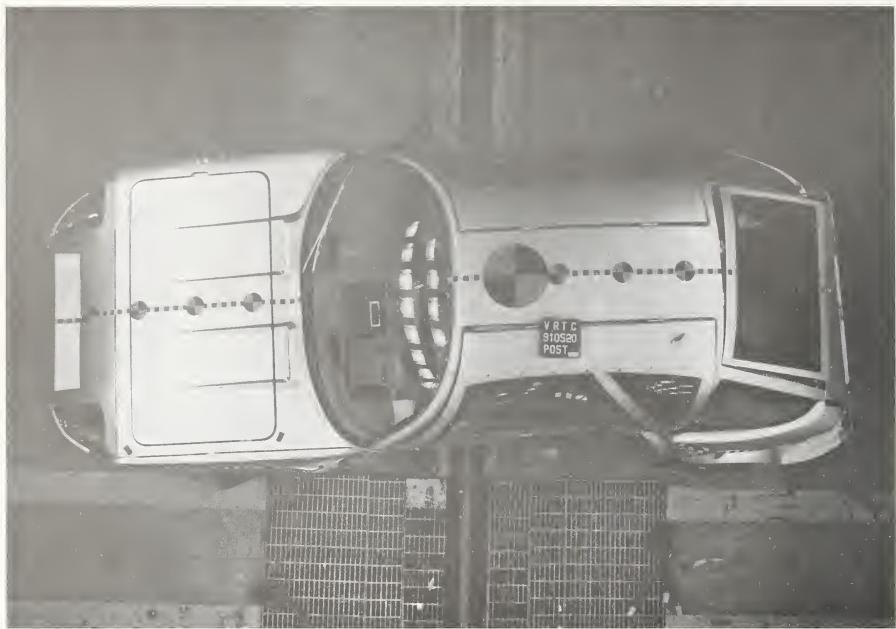


Figure A-19. POST-TEST VEHICLE TOP - VIEW 1

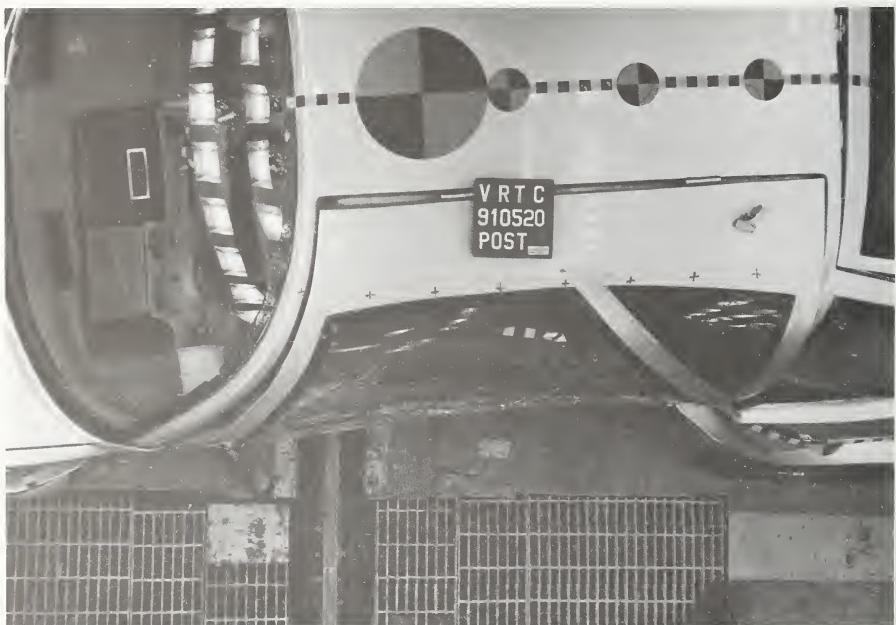


Figure A-20. POST-TEST VEHICLE TOP - VIEW 2

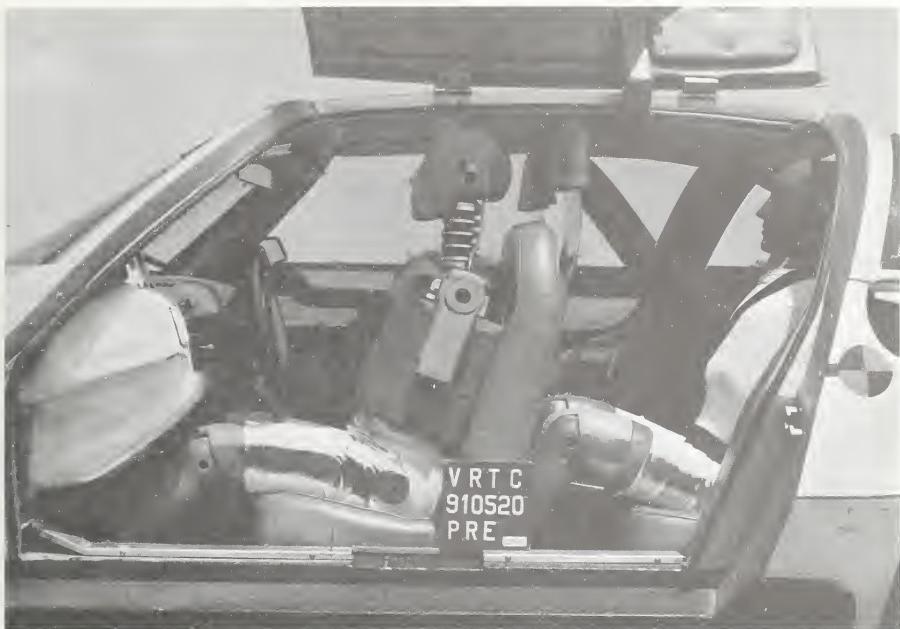


Figure A-21. PRE-TEST DRIVER AND PASSENGER DUMMIES LEFT SIDE VIEW



Figure A-22. POST-TEST DRIVER AND PASSENGER DUMMIES RIGHT SIDE VIEW



Figure A-23. PRE-TEST DRIVER DUMMY - VIEW 1



Figure A-24. PRE-TEST DRIVER DUMMY - VIEW 2



Figure A-25. PRE-TEST DRIVER DUMMY - VIEW 3



Figure A-26. PRE-TEST PASSENGER DUMMY - VIEW 1



Figure A-27. PRE-TEST PASSENGER DUMMY - VIEW 2



Figure A-28. PRE-TEST PASSENGER DUMMY - VIEW 3



Figure A-29. POST-TEST PASSENGER DUMMY - VIEW 1



Figure A-30. POST-TEST PASSENGER DUMMY - VIEW 2



Figure A-31. POST-TEST DRIVER DUMMY CONTACT - VIEW 1



Figure A-32. POST-TEST DRIVER DUMMY CONTACT - VIEW 2



Figure A-33. POST-TEST DRIVER DUMMY CONTACT - VIEW 3



Figure A-34. POST-TEST PASSENGER DUMMY CONTACT - VIEW 1

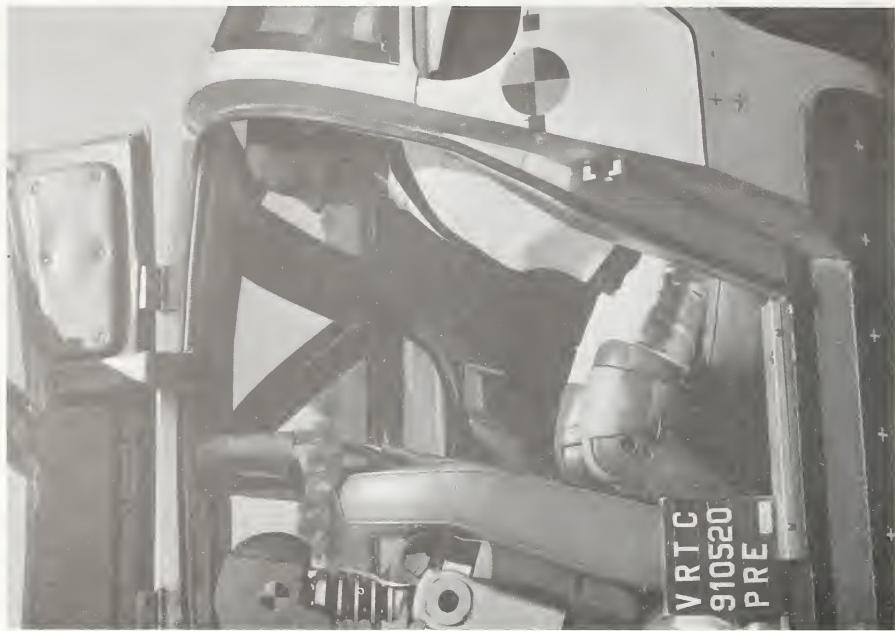


Figure A-35. POST-TEST PASSENGER DUMMY CONTACT - VIEW 2



Figure A-36. POST-TEST BARRIER FACE - VIEW 1

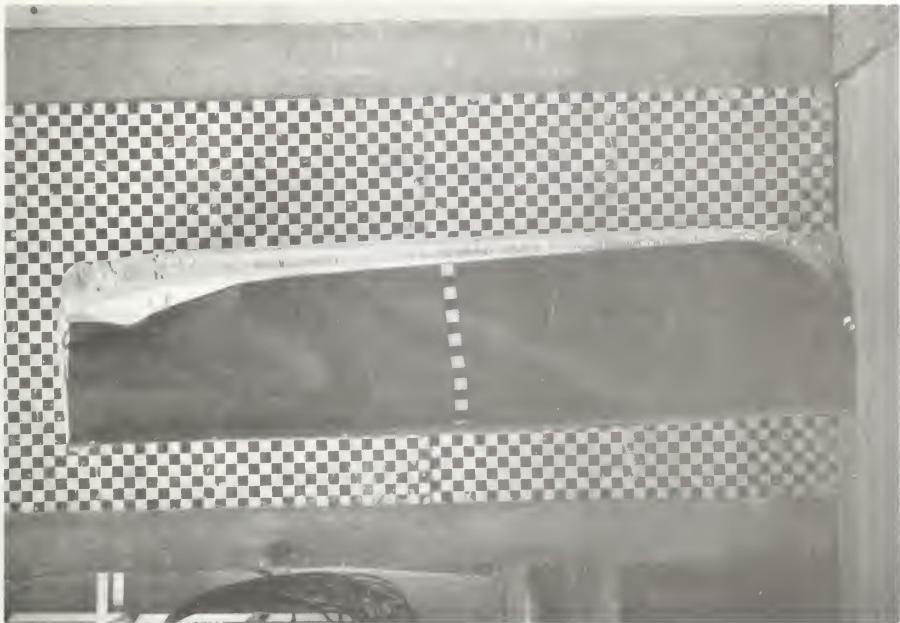


Figure A-37. POST-TEST BARRIER FACE - VIEW 2

APPENDIX B

DATA PLOT PRESENTATION

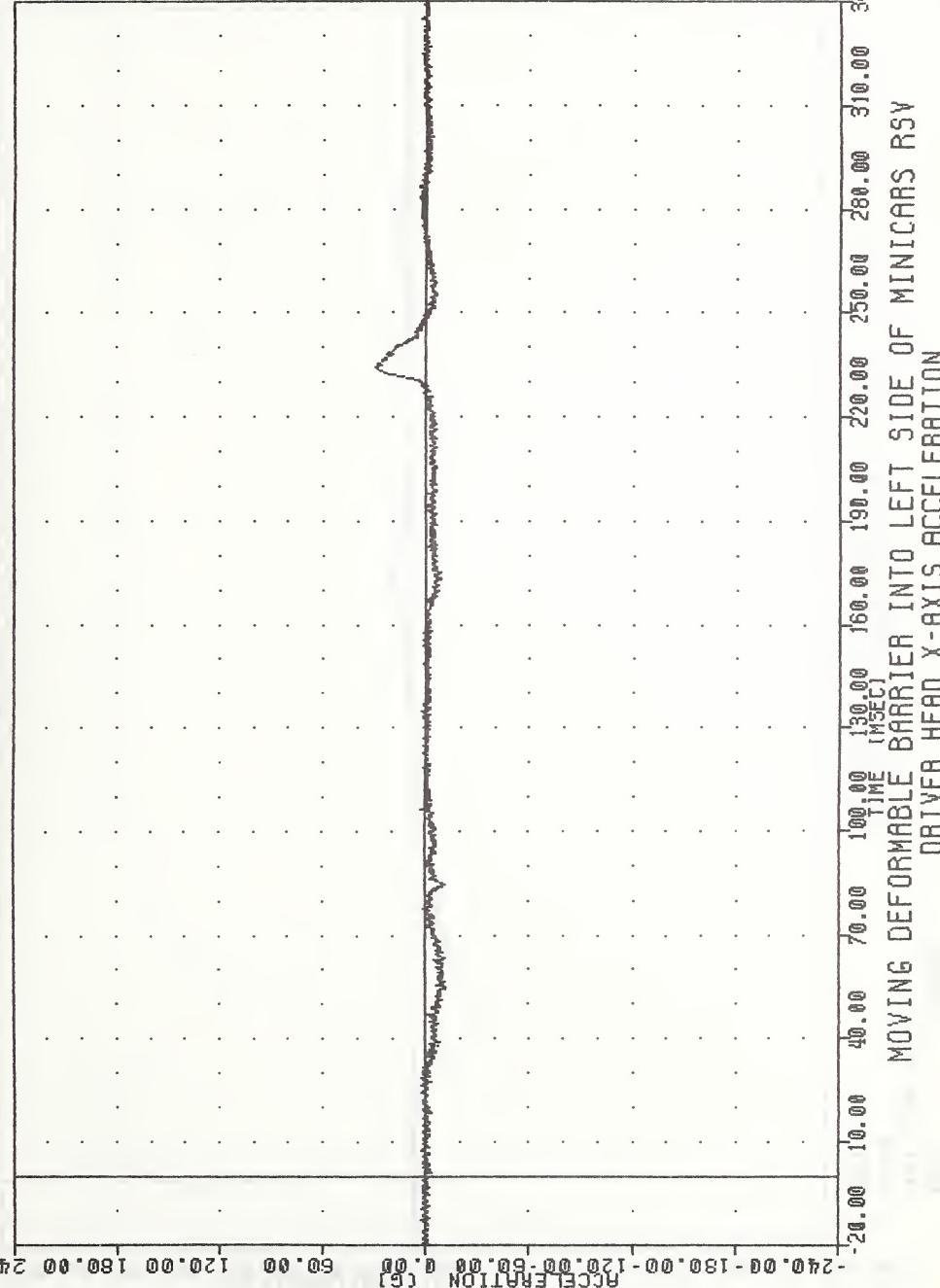
Data plots generated from the crash test data are presented on the following pages. All data are recorded on magnetic tape for inclusion in the NHTSA crash test data base system. All data were filtered according to SAE J211 OCT88 except that dummy thorax and pelvis data were filtered using the HSRI filter.

VRTC 910520
LEFT SIDE IMPACT
91140

HEDX61

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -11.53@ 56.50 ,

29.70 e 234.50



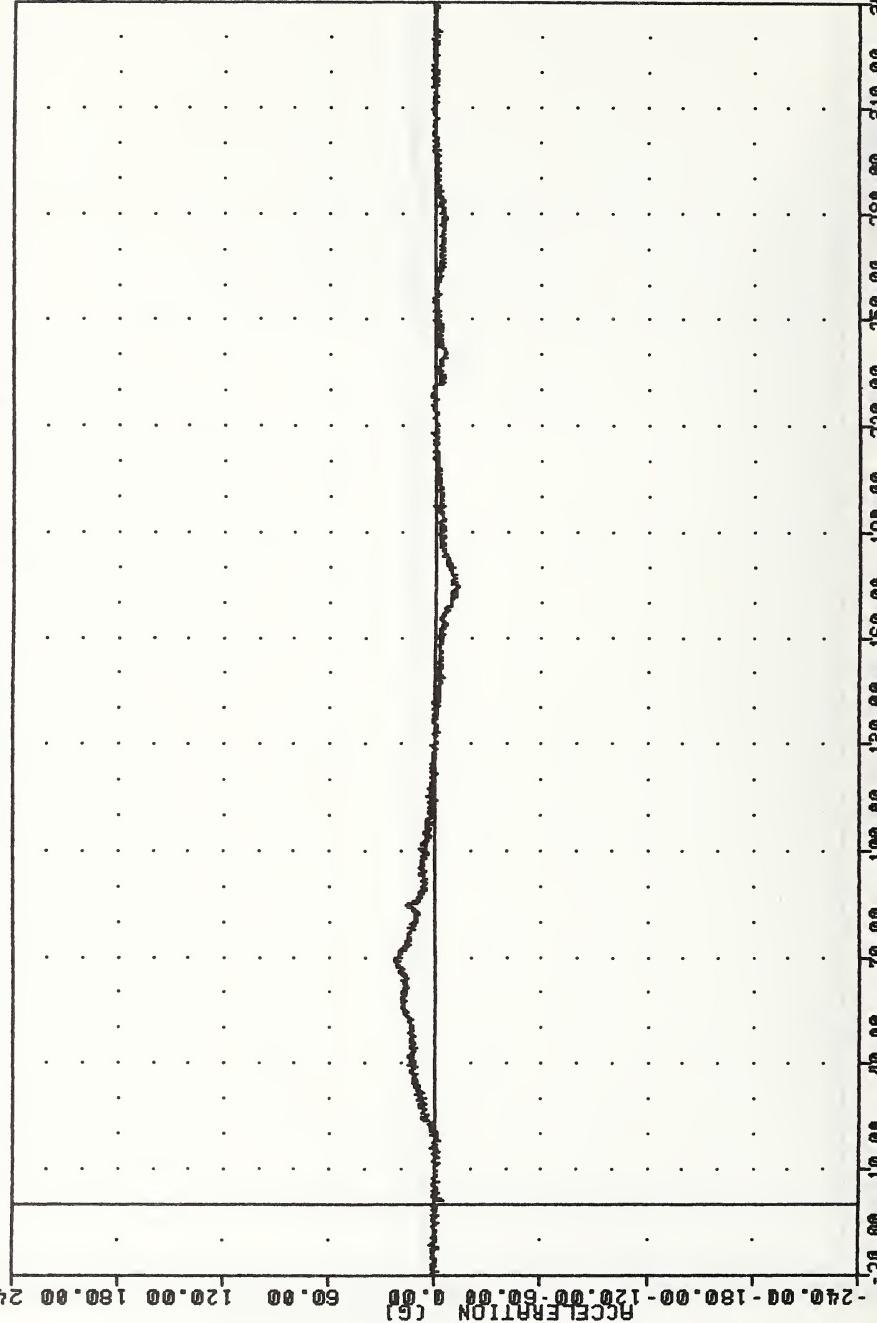
-240.00 -180.00 -120.00 -60.00 0.00 60.00 120.00 160.00 130.00 100.00 70.00 40.00 10.00 200.00 250.00 280.00 310.00 340.00
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER HEAD X-AXIS ACCELERATION

YRTC , 910520
LEFT SIDE IMPACT

91140
HEDY61

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -12.088 174.00 ,

23.34 & 69.63

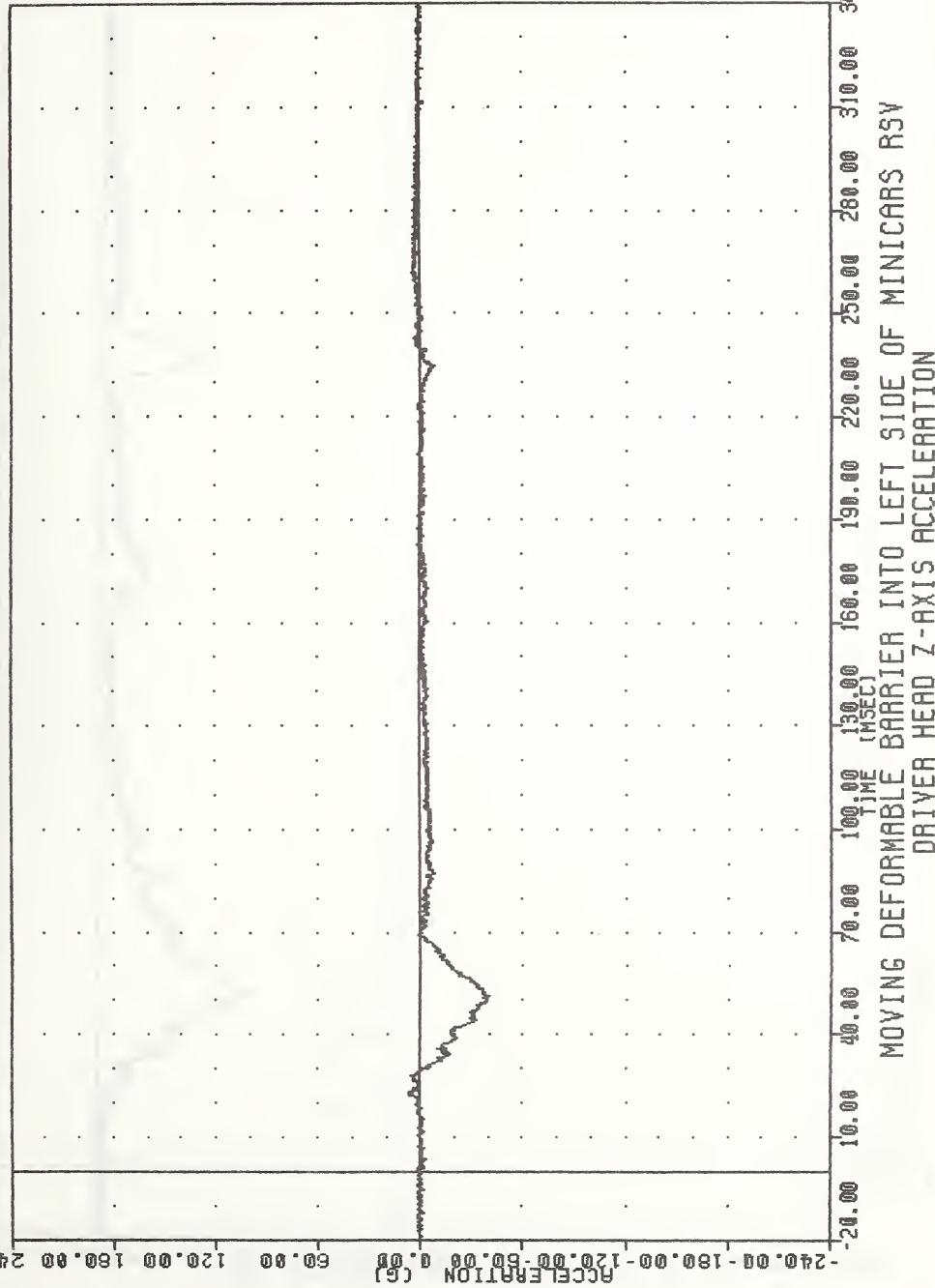


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER HEAD Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
9114@
MEDZ61

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -40.10@ 51.25@

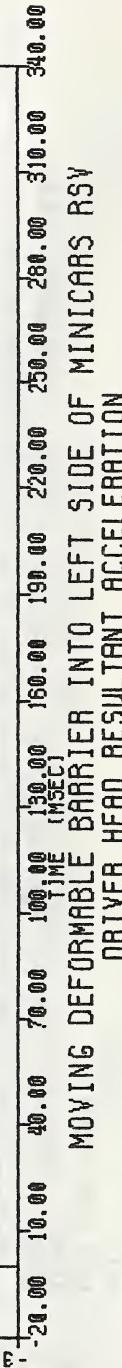
6.63 @ 22.38



YRTC
LEFT SIDE IMPACT
91140
HEORG1

MIN, MAX VALUES = 0.148 -8.50 , 43.67 & 51.25

FILTER = ALPF 1650/ 5214/ -40

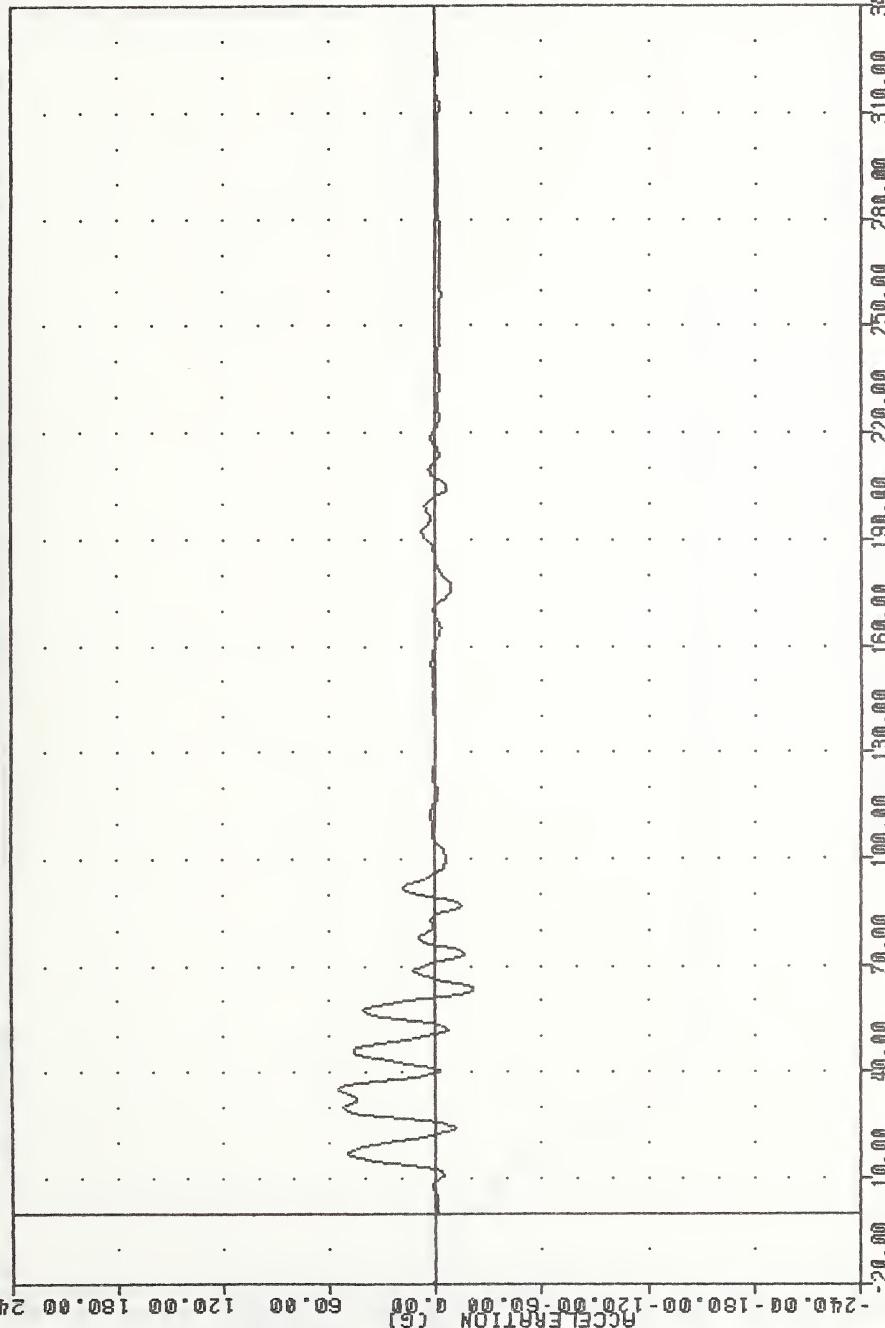


VRTC 910520
LEFT SIDE IMPACT
9114@ SHLYG1

MIN, MAX VALUES = -21.48@ 63.13 , 55.14 @ 35.00

FILTER = HSRI

136/ 189/ -5@

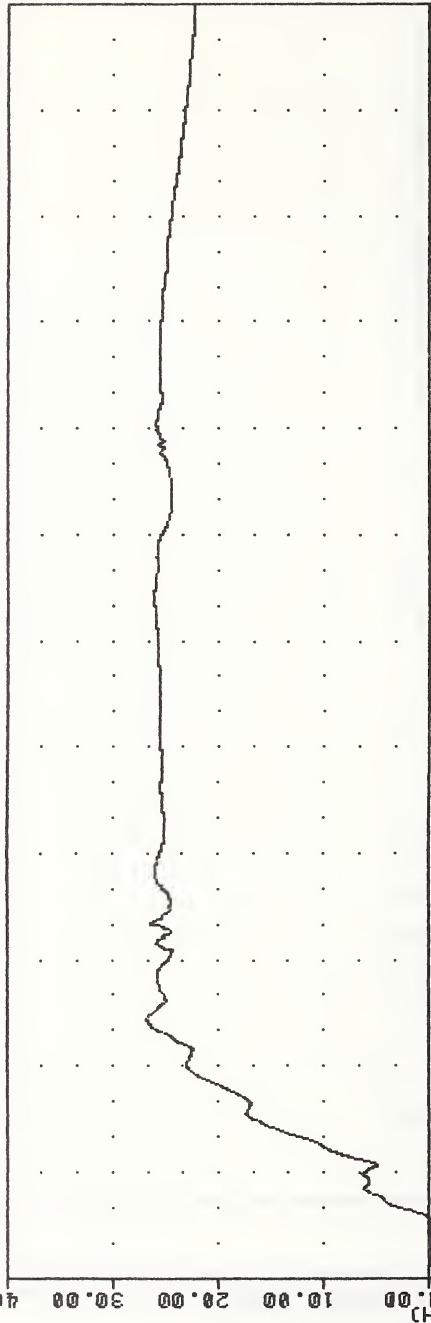


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT SHOULDER Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
9114@
SHLYW1

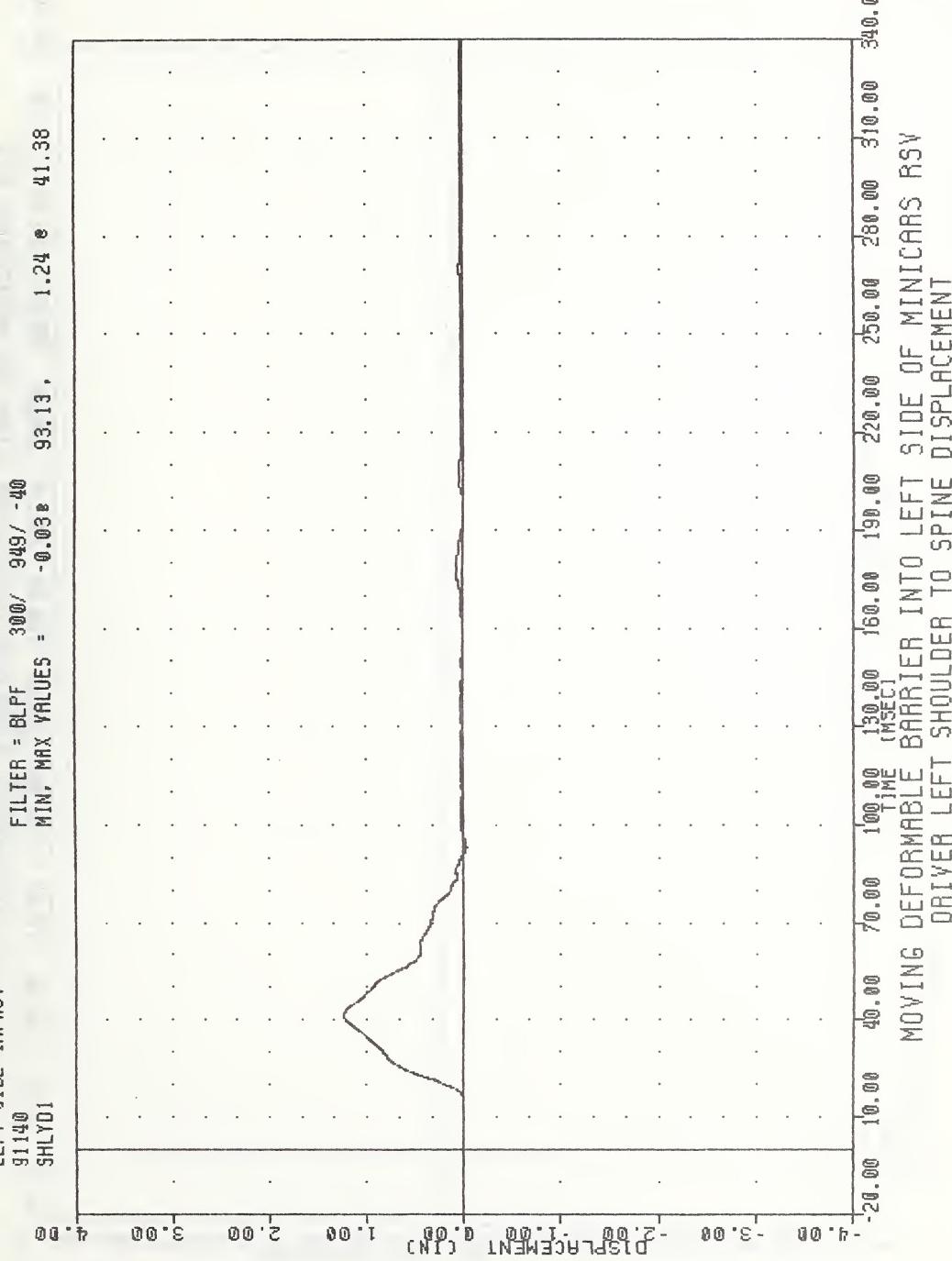
FILTER = RLFF 1650/
MIN. MAX VALUES = -0.15@ 12.25 @

26.70 @ 61.13



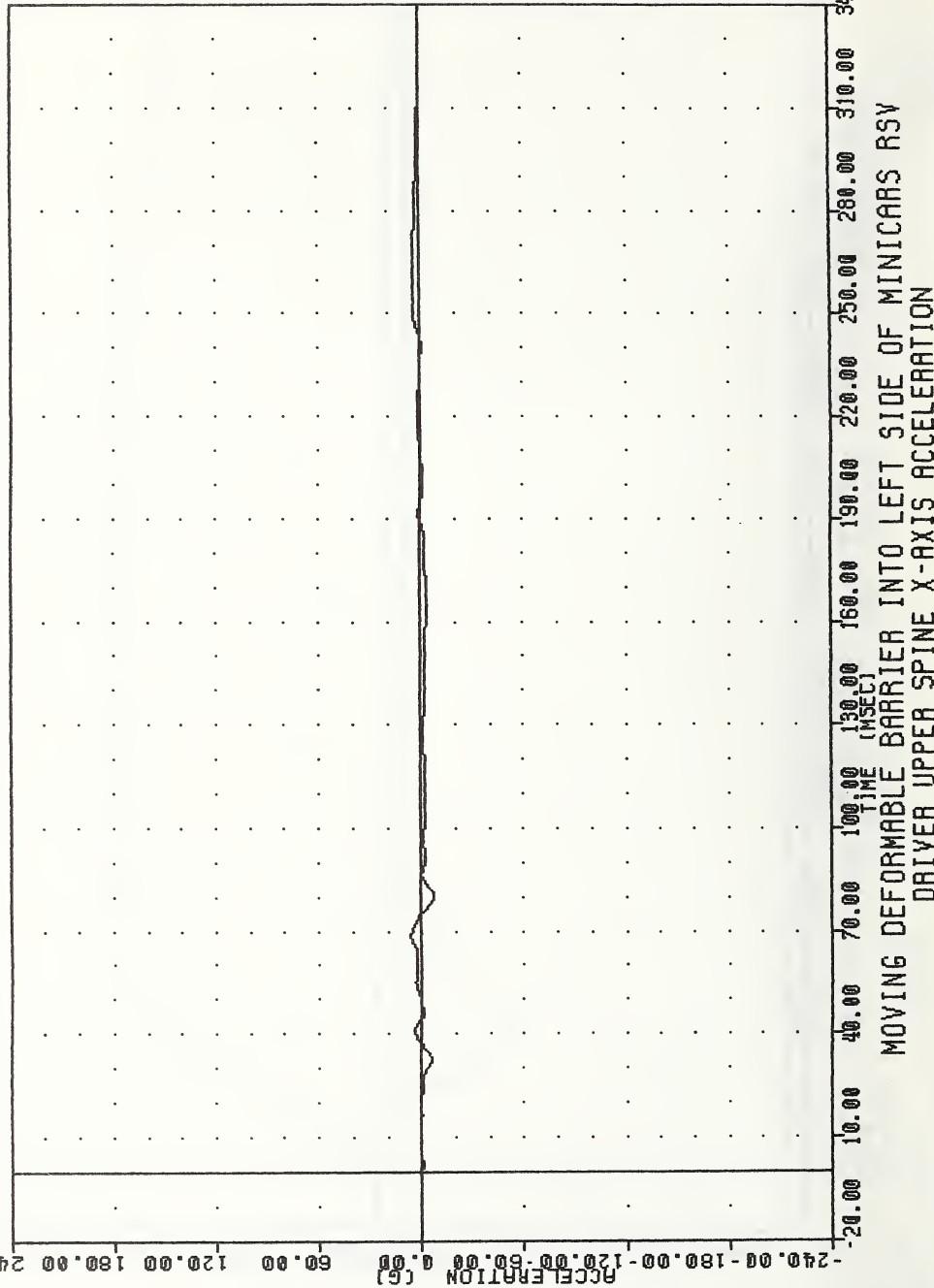
0.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00
TIME (msec)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT SHOULDER Y-AXIS VELOCITY

VRTC 910520
LEFT SIDE IMPACT
9114@ SHLYD1



VRTC
LEFT SIDE IMPACT
91140
T01XG1

MIN, MAX VALUES = -7.768 80.00
FILTER = HSRI 136/ 189/ -50



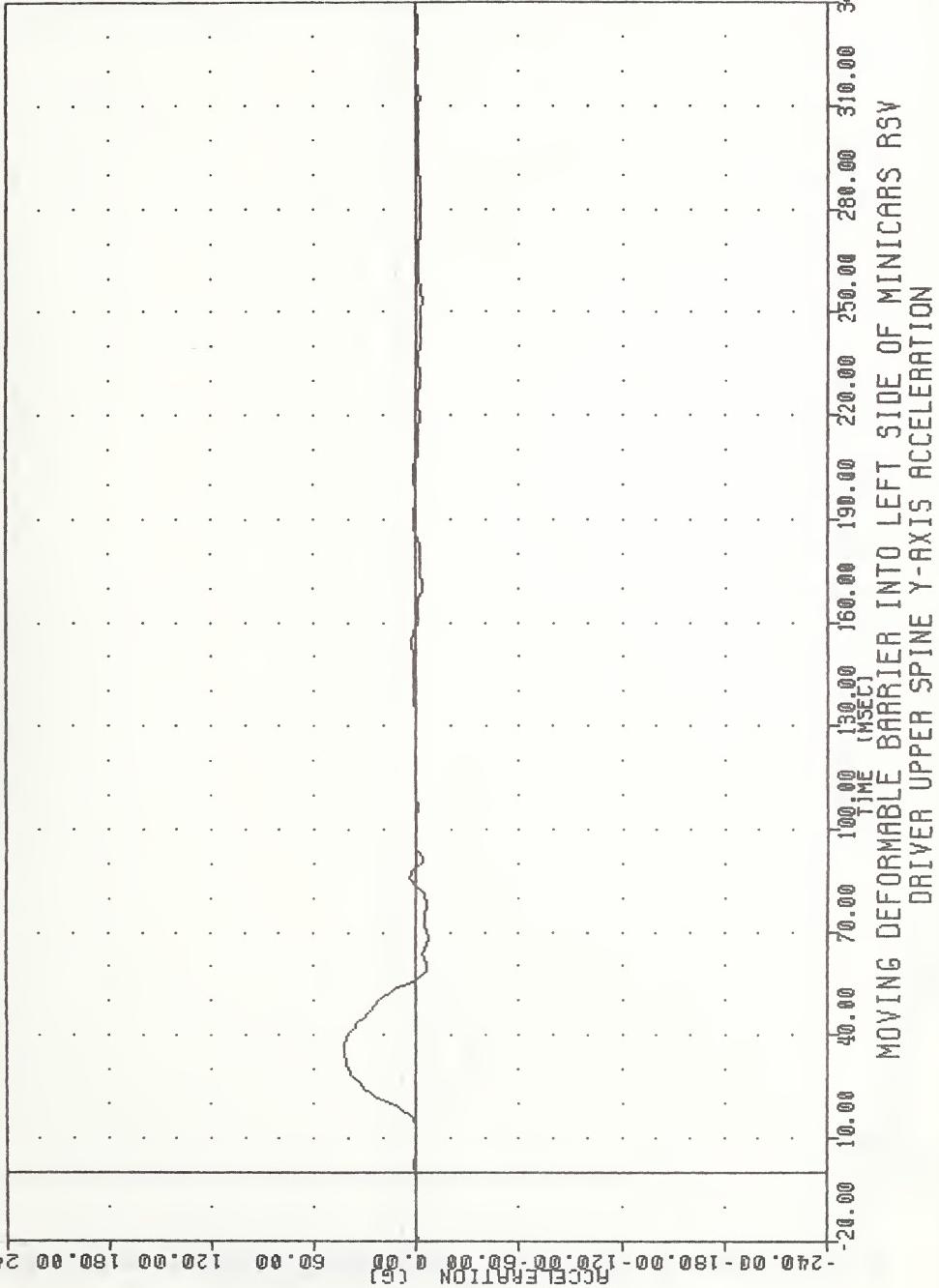
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER UPPER SPINE X-AXIS ACCELERATION

VRTC 910520
LEFT SIDE IMPACT
91140

TO1Y61

FILTER = HSRL
MIN., MAX VALUES = 136/ 189/-50
-7.338 68.75 ,

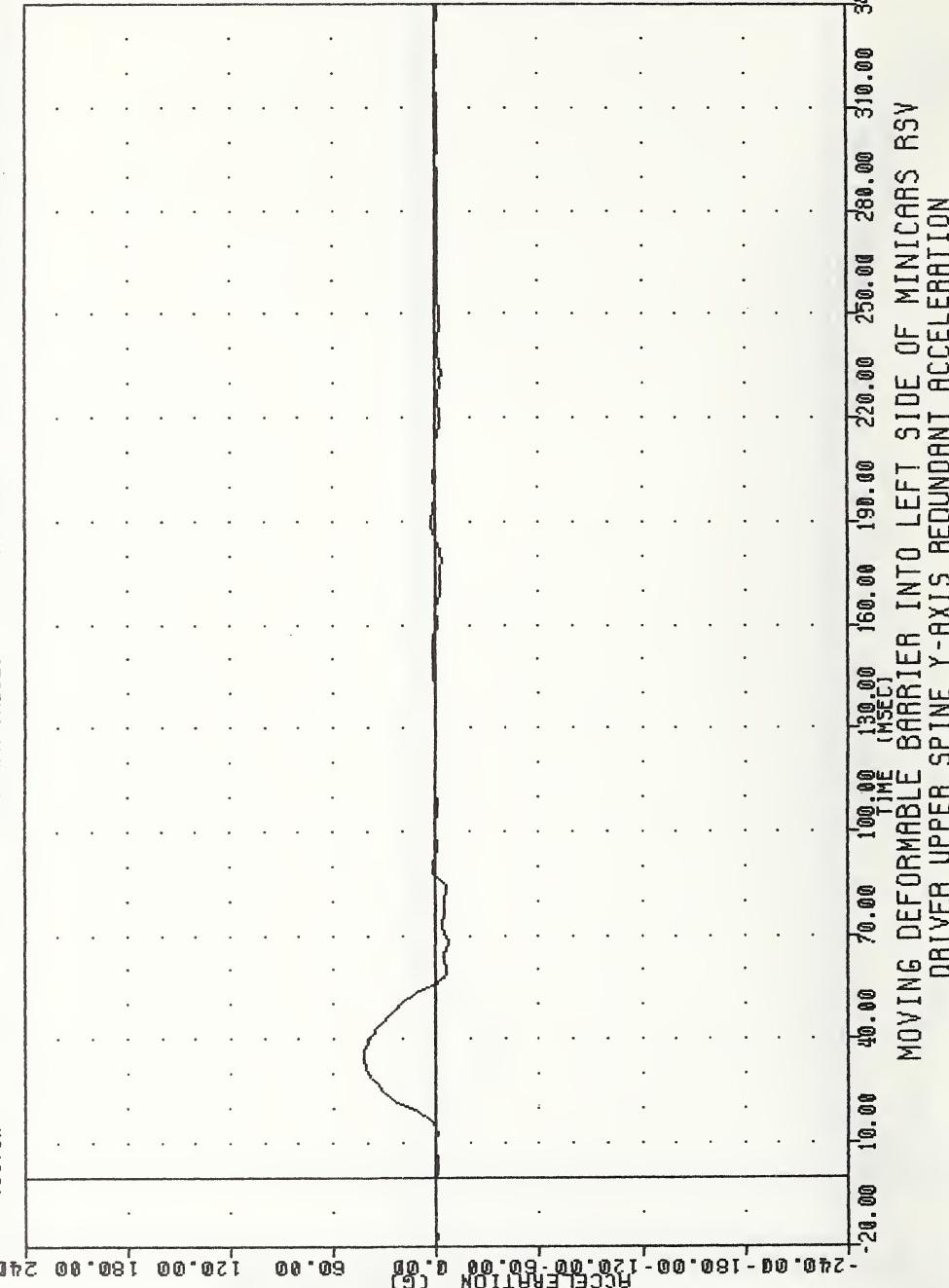
42.72 & 36.25



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER UPPER SPINE Y-AXIS ACCELERATION

VRTC SIDE IMPACT
91140
T01YGA

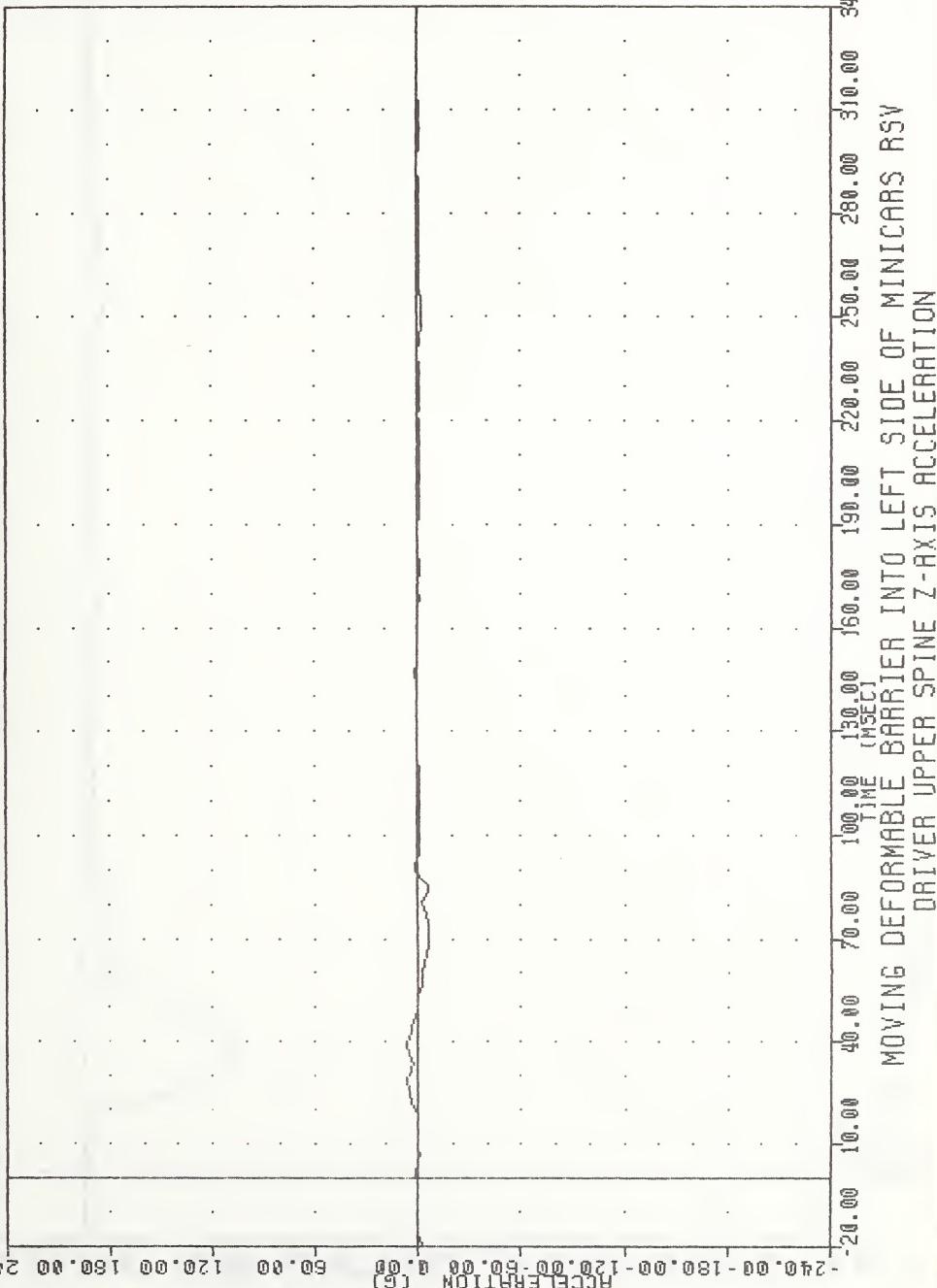
910520
LEFT SIDE IMPACT
FILTER = HSRI
MIN, MAX VALUES = 136/
189/-50
-7.29@



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER UPPER SPINE Y-AXIS REDUNDANT ACCELERATION

VRTC 91052@
LEFT SIDE IMPACT
9114@ T012761

FILTER = HSRI
MIN., MAX VALUES = -6.31@ 69.38 ,
6.42 @ 38.75



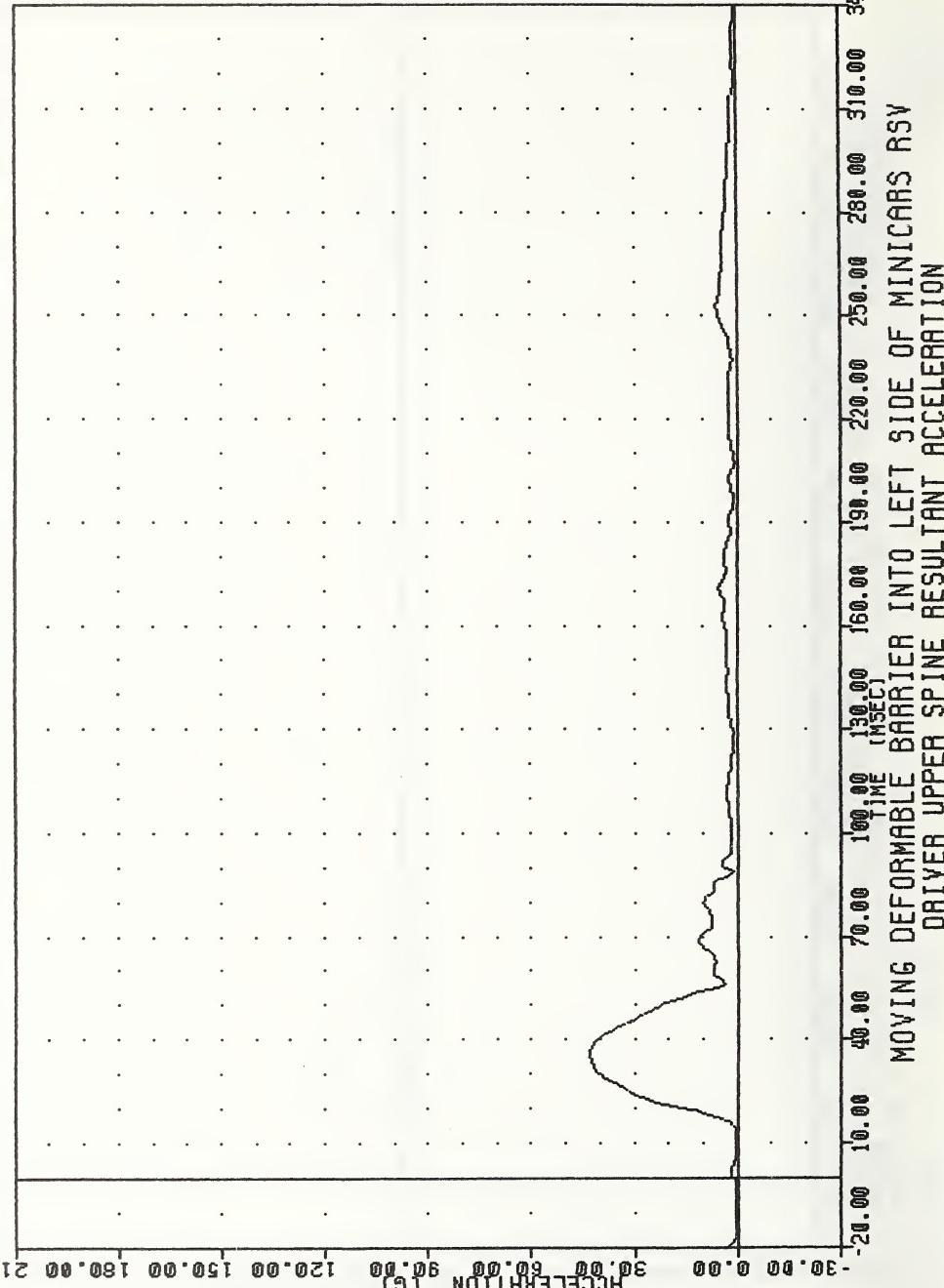
11/16/2000

YRTC
LEFT SIDE IMPACT
9114@
T01RC1

910520
LEFT SIDE IMPACT
9114@
T01RC1

MIN. MAX VALUES = 136/
189/ -50
0.14@ 13.75 ,

13.05 @ 36.25



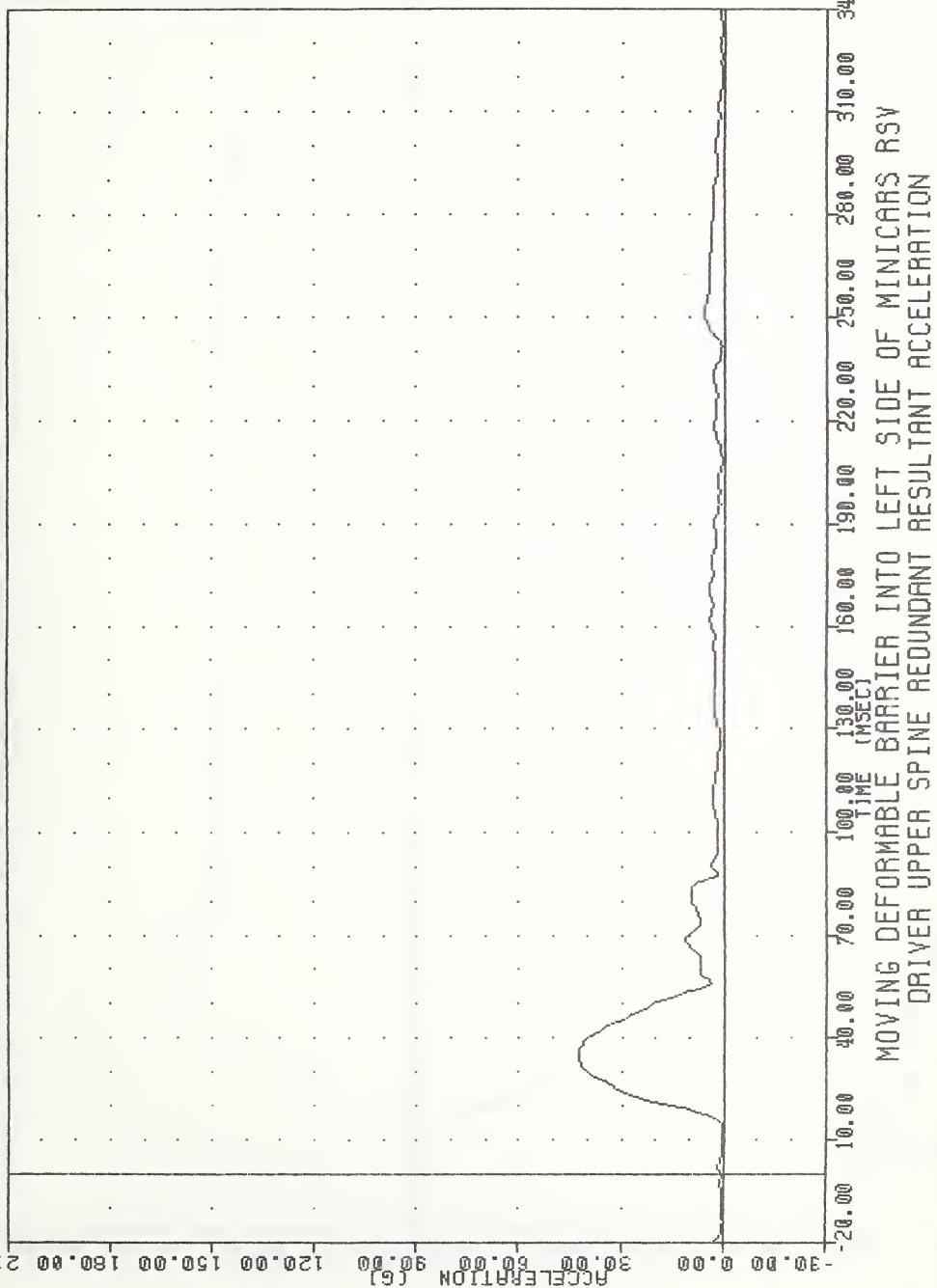
FILTER = HSRI
MIN. MAX VALUES = 136/
189/ -50
0.14@ 13.75 ,
13.05 @ 36.25
-30.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER UPPER SPINE RESULTANT ACCELERATION

YRTC 910520
LEFT SIDE IMPACT

91140
TO TRIGA

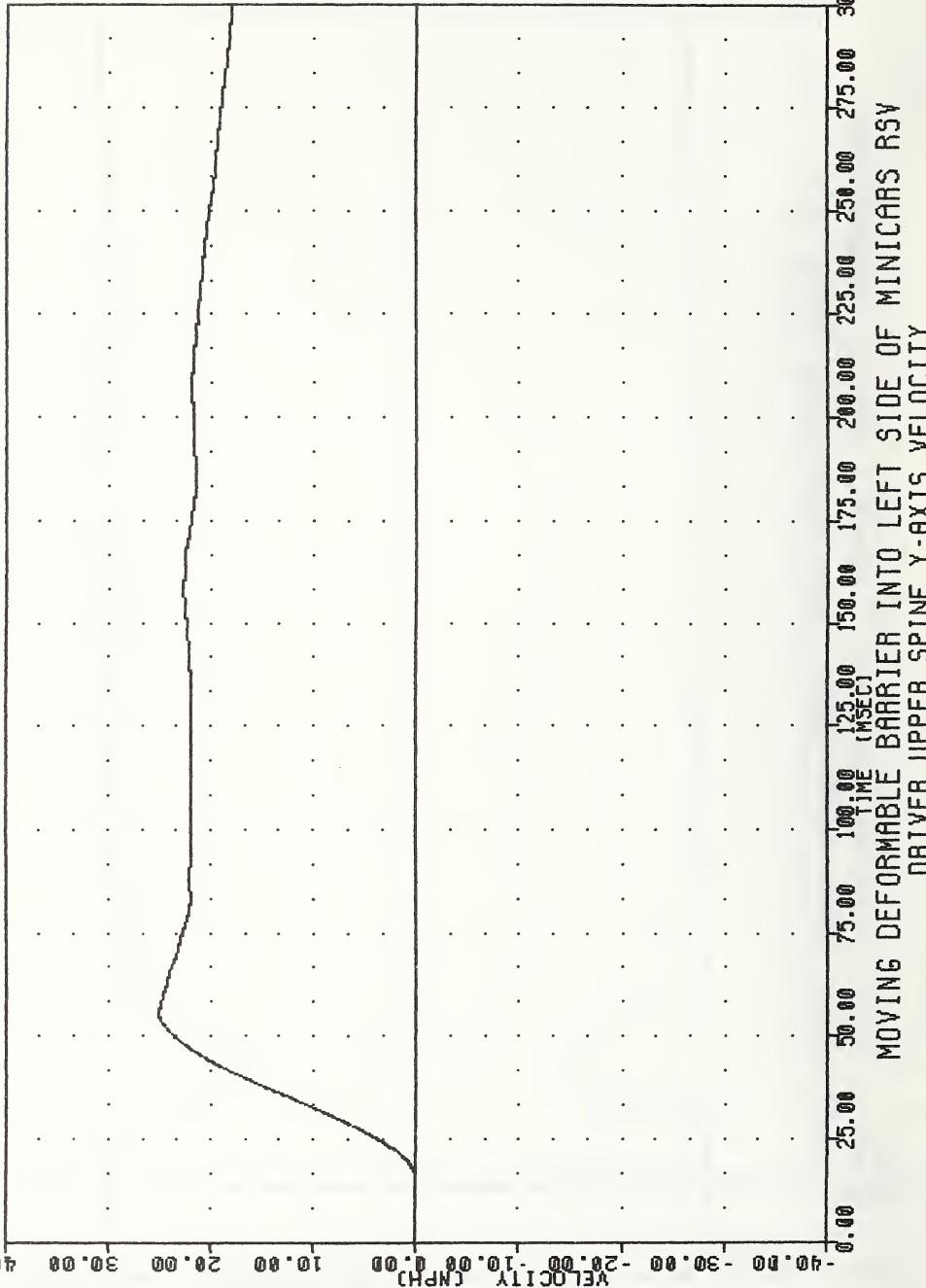
FILTER = HSRI
MIN, MAX VALUES = 189/-50
0.008 -13.75

42.64 6 35.63



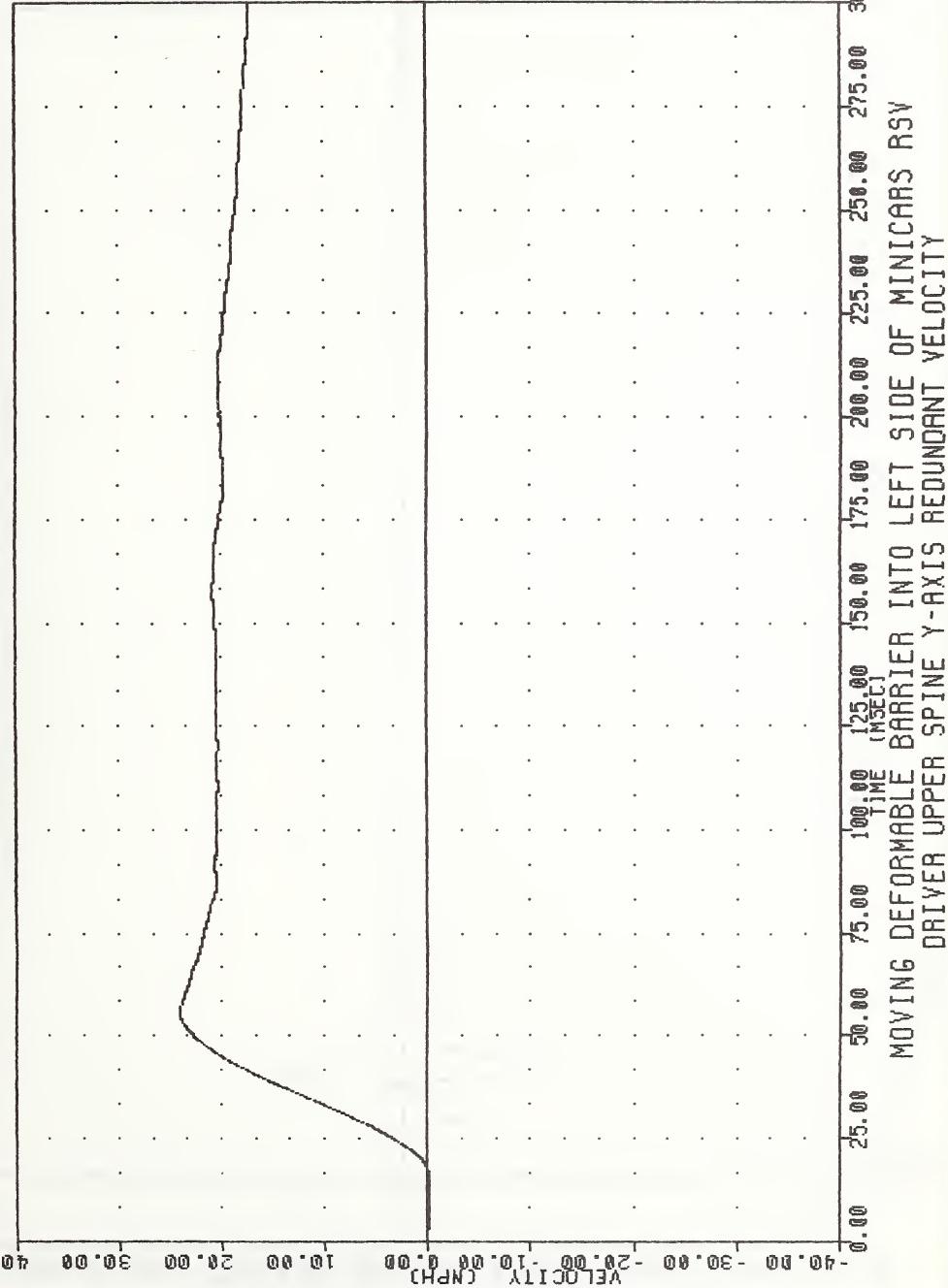
YRTC
LEFT SIDE IMPACT
9114@
T01YY1

FILTER = ALPPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.01B 0.88 , 25.02 @ 55.25



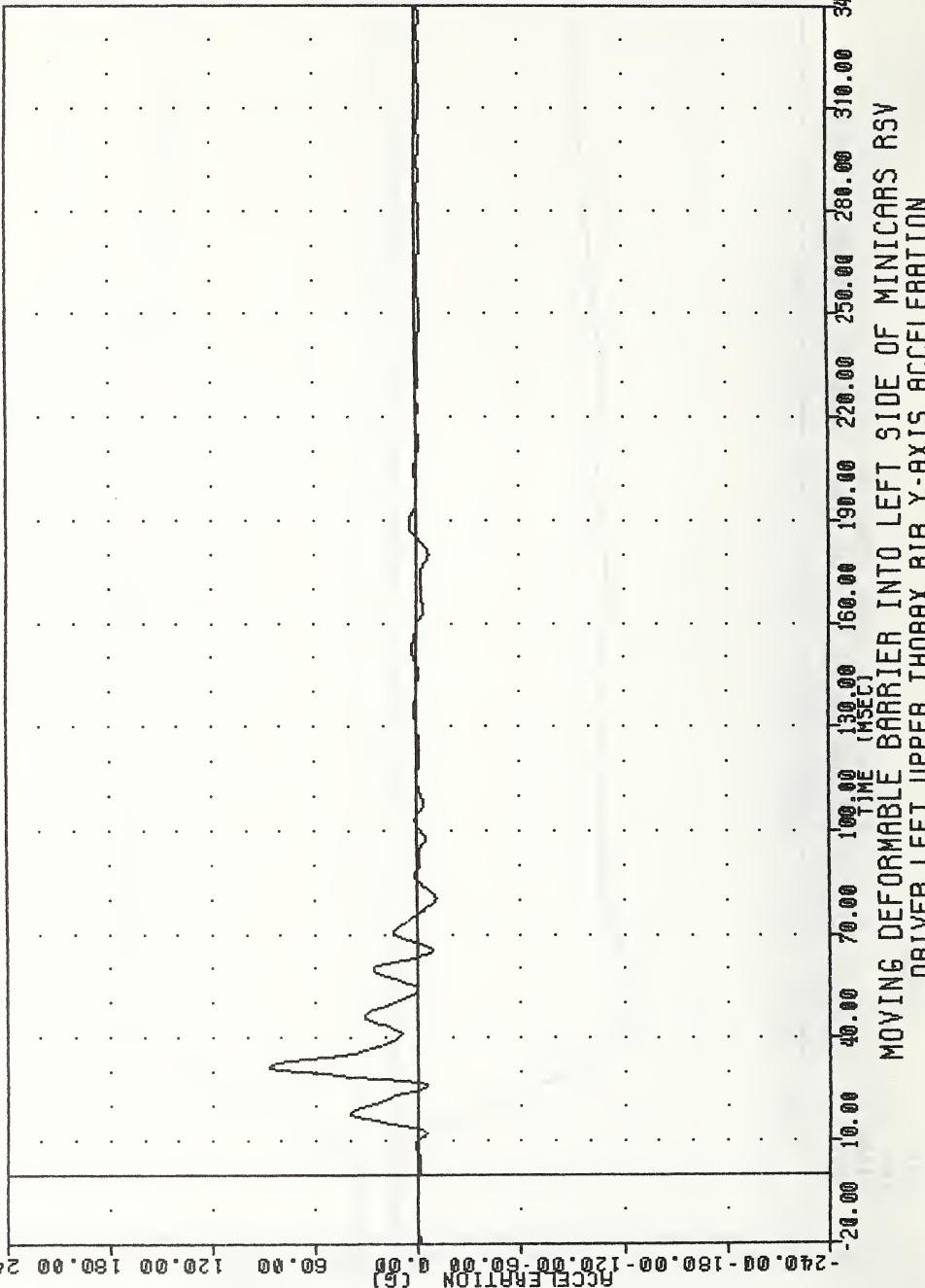
VRTC
LEFT SIDE IMPACT
91140
101YVA

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.218 14.25 , 23.99 e 55.75



VRTC 910520
LEFT SIDE IMPACT
9114@ LURY61

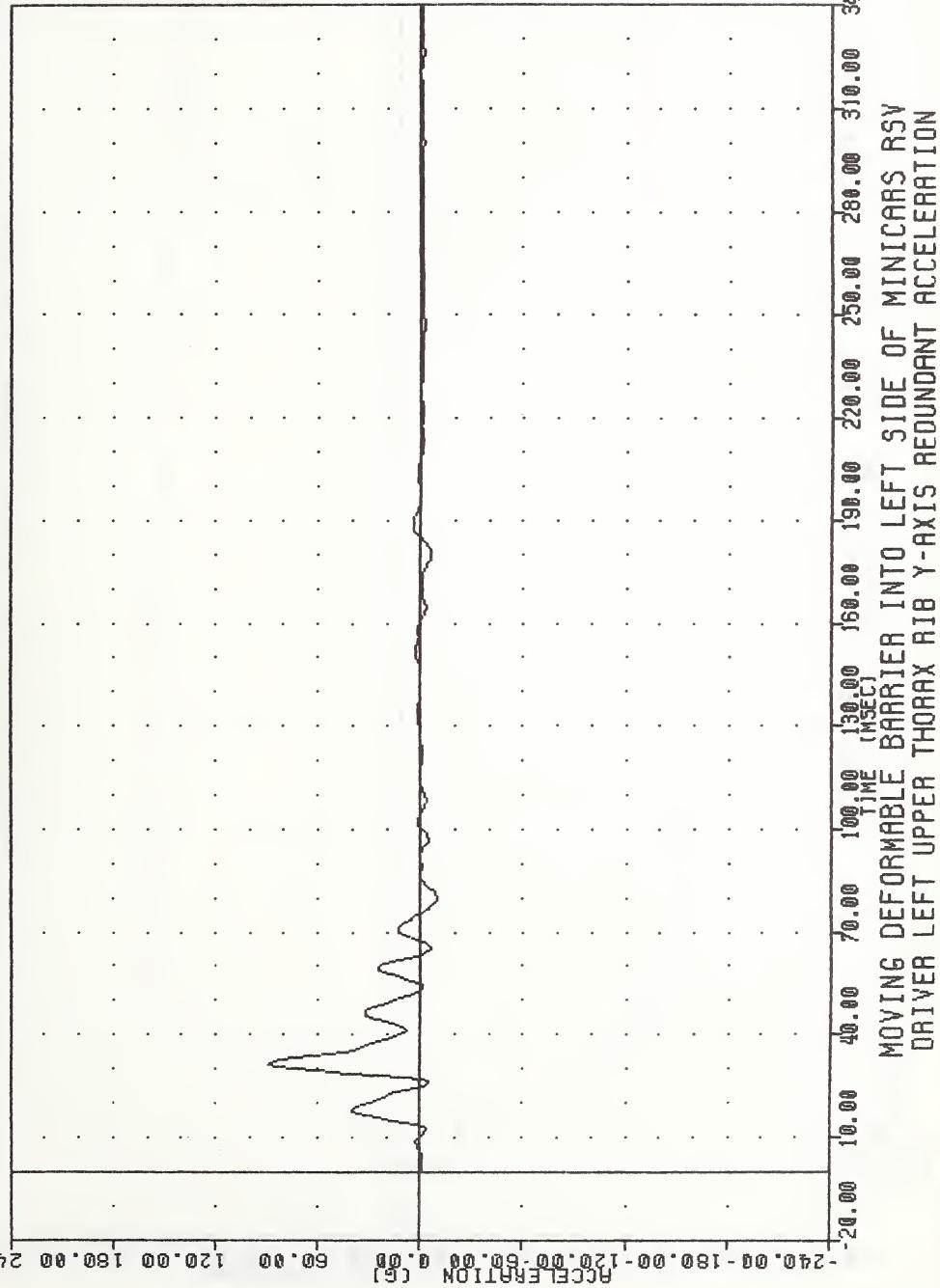
FILTER = HSRII
MIN, MAX VALUES = 136/-189/-50
86.99 @ 31.88



VRTC : 910520
LEFT SIDE IMPACT
91140

LURIGA

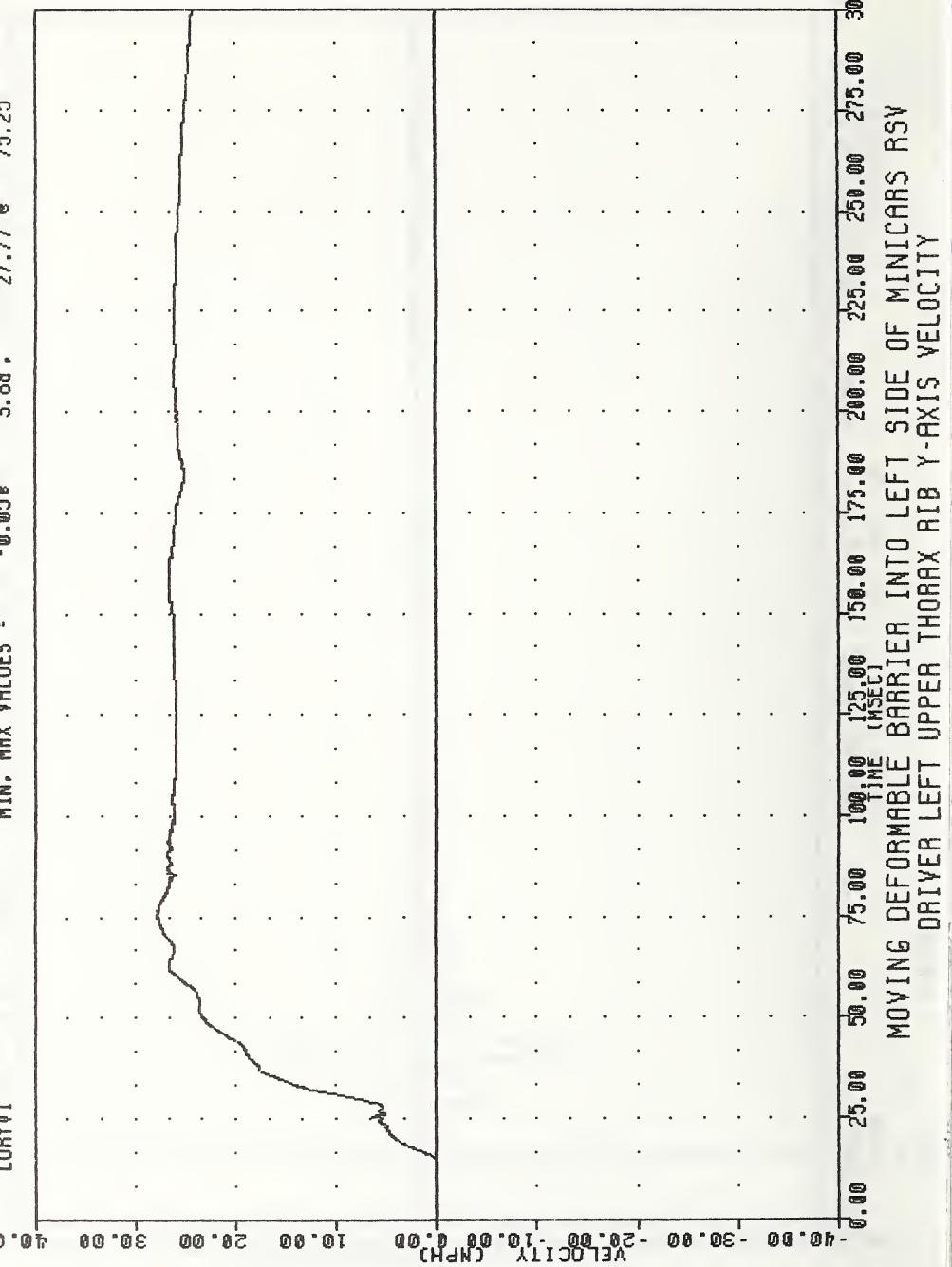
FILTER = HSRI
MIN, MAX VALUES = -9.948 80.00 ,
89.14 & 31.25



VRTC
LEFT SIDE IMPACT
9114@
LURV1

MIN., MAX VALUES = -0.05@ 3.88@ 27.77@ 75.25@

FILTER = ALPF 1650/ 5214/ -40



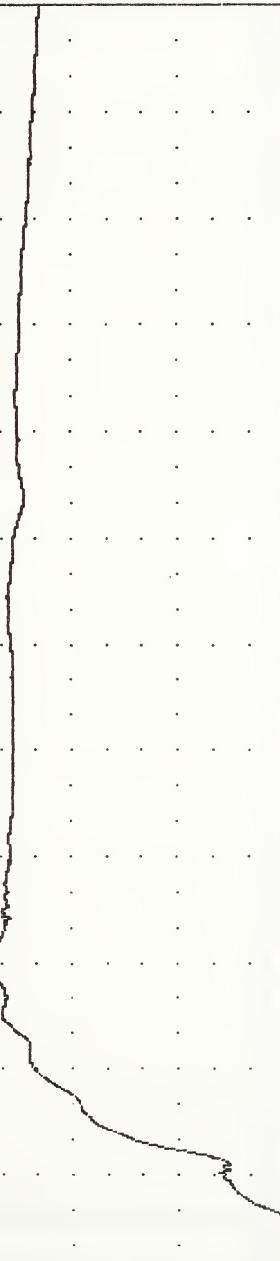
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT UPPER THORAX RIB Y-AXIS VELOCITY

YRTC 910520
LEFT SIDE IMPACT
91140 LURVIA

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.098 5.75 ,

27.66 & 75.13

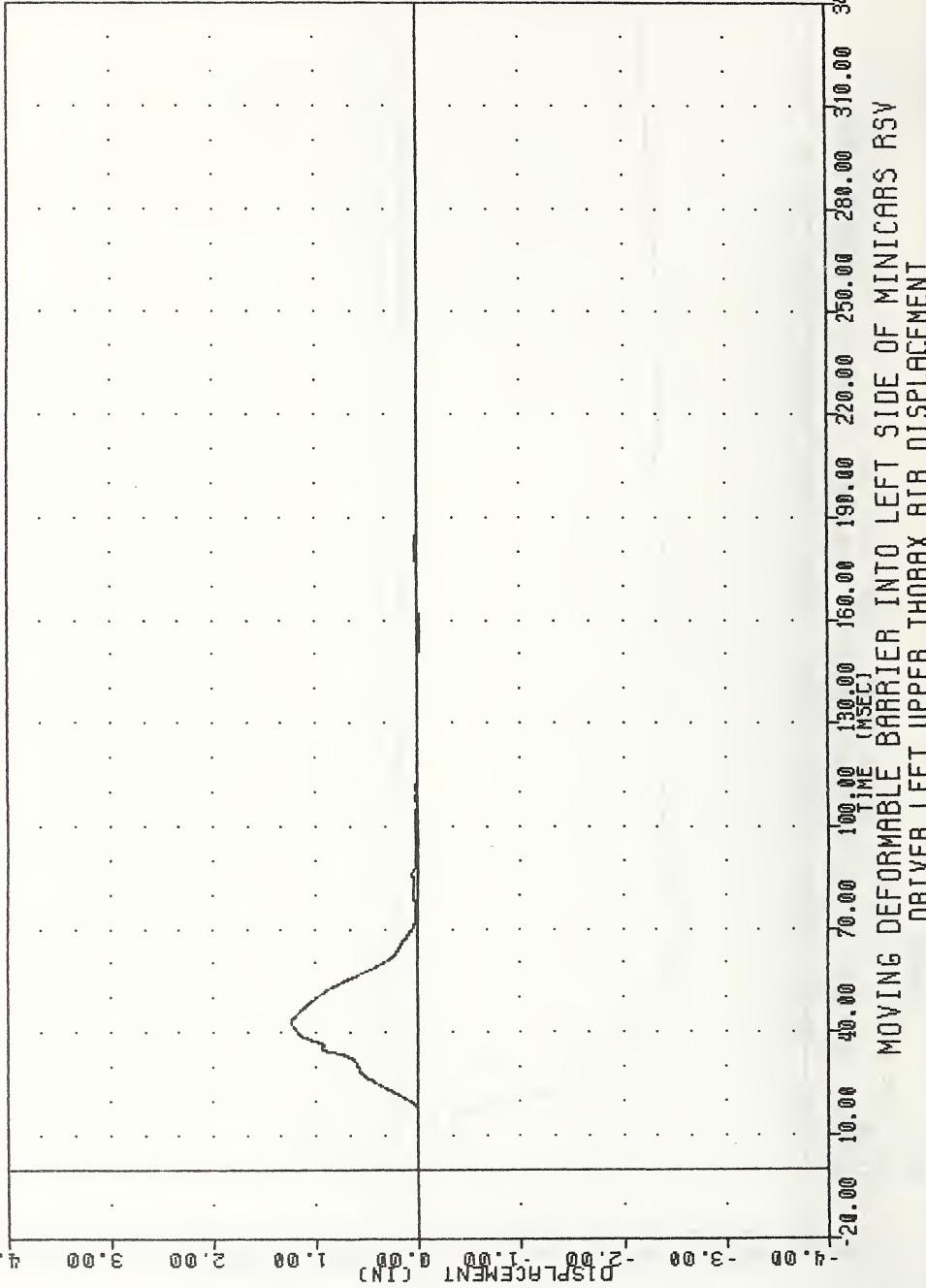
40.00 35.00 30.00 25.00 20.00 15.00 10.00 5.00 0.00 -5.00 -10.00 -15.00 -20.00 -25.00 -30.00 VELODITY (CMPS)



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT UPPER THORAX RIB Y-AXIS REDUNDANT VELOCITY

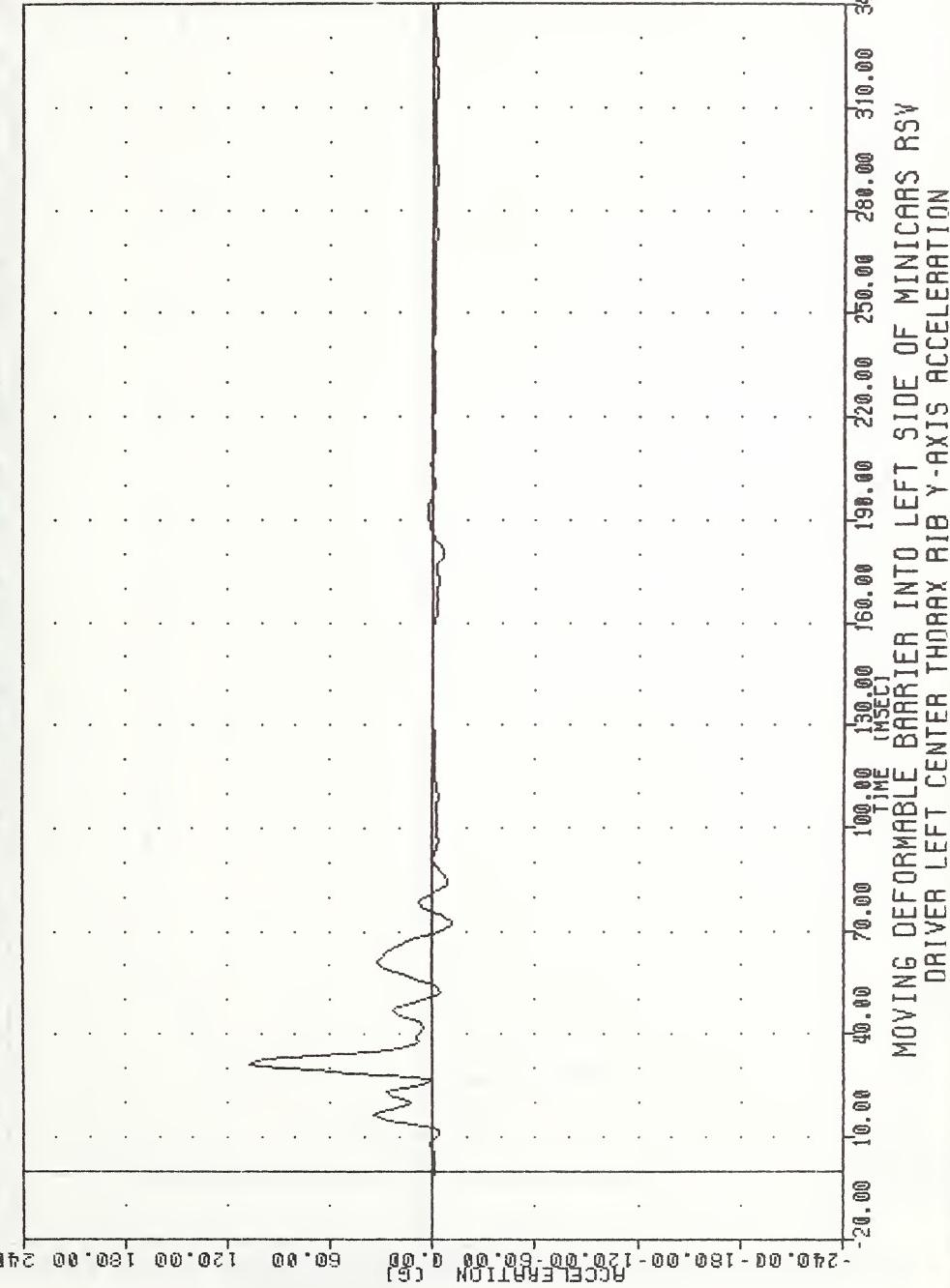
VRTC
LEFT SIDE IMPACT
9114@
LURYD1

910520
FILTER = BLPF
MIN. MAX VALUES = -0.018 155.13 , 1.23 e 42.75



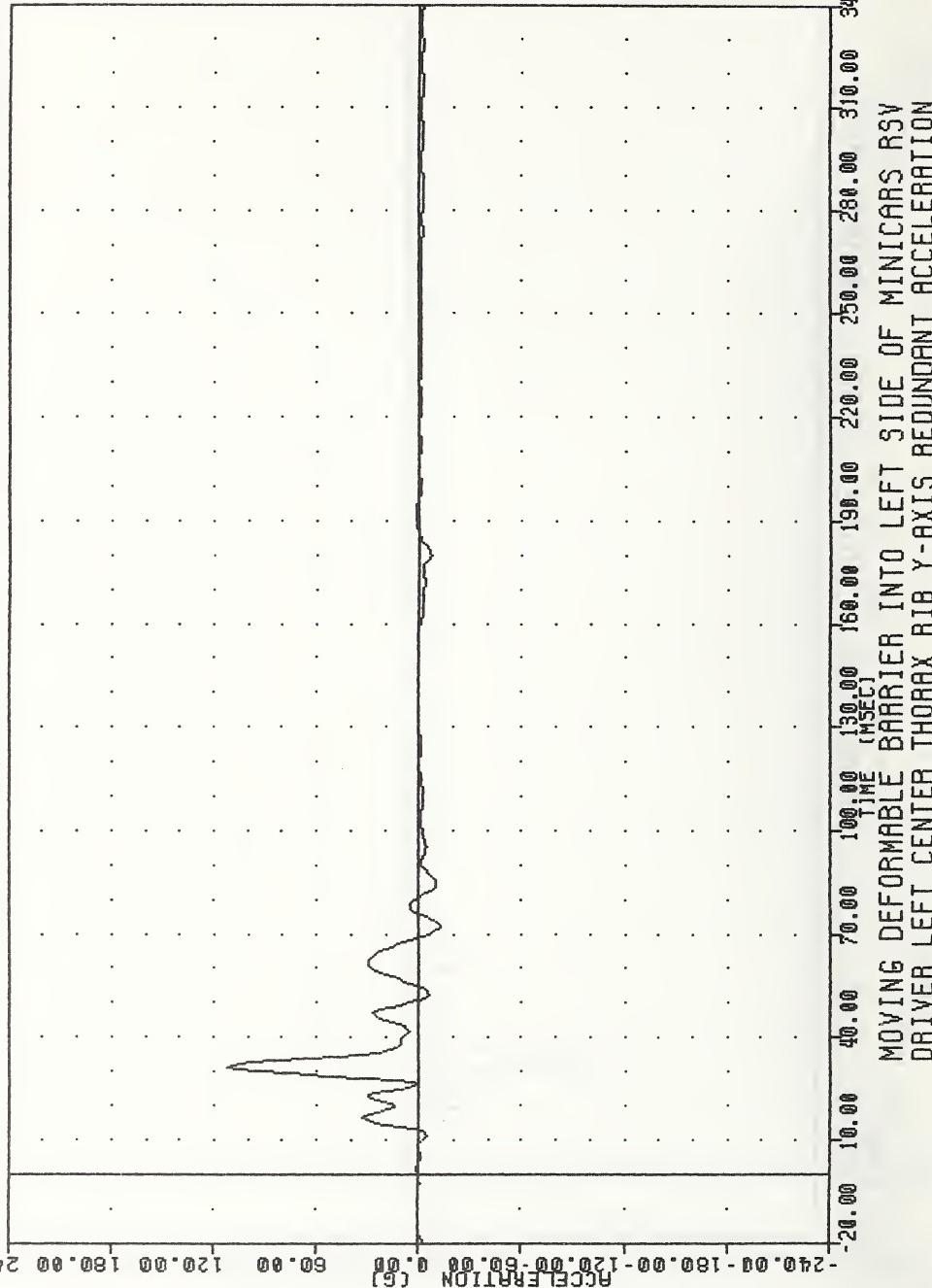
YRIC
LEFT SIDE IMPACT
9114@
LCRY61

MIN, MAX VALUES = -11.64@ 72.50 . 107.14 @ 31.25



VRTC
LEFT SIDE IMPACT
9114@
LCRYGA

91052@
FILTER = HSRI
MIN, MAX VALUES = 136/ -50
-12.32@ 72.5@ , 111.78 @ 31.25

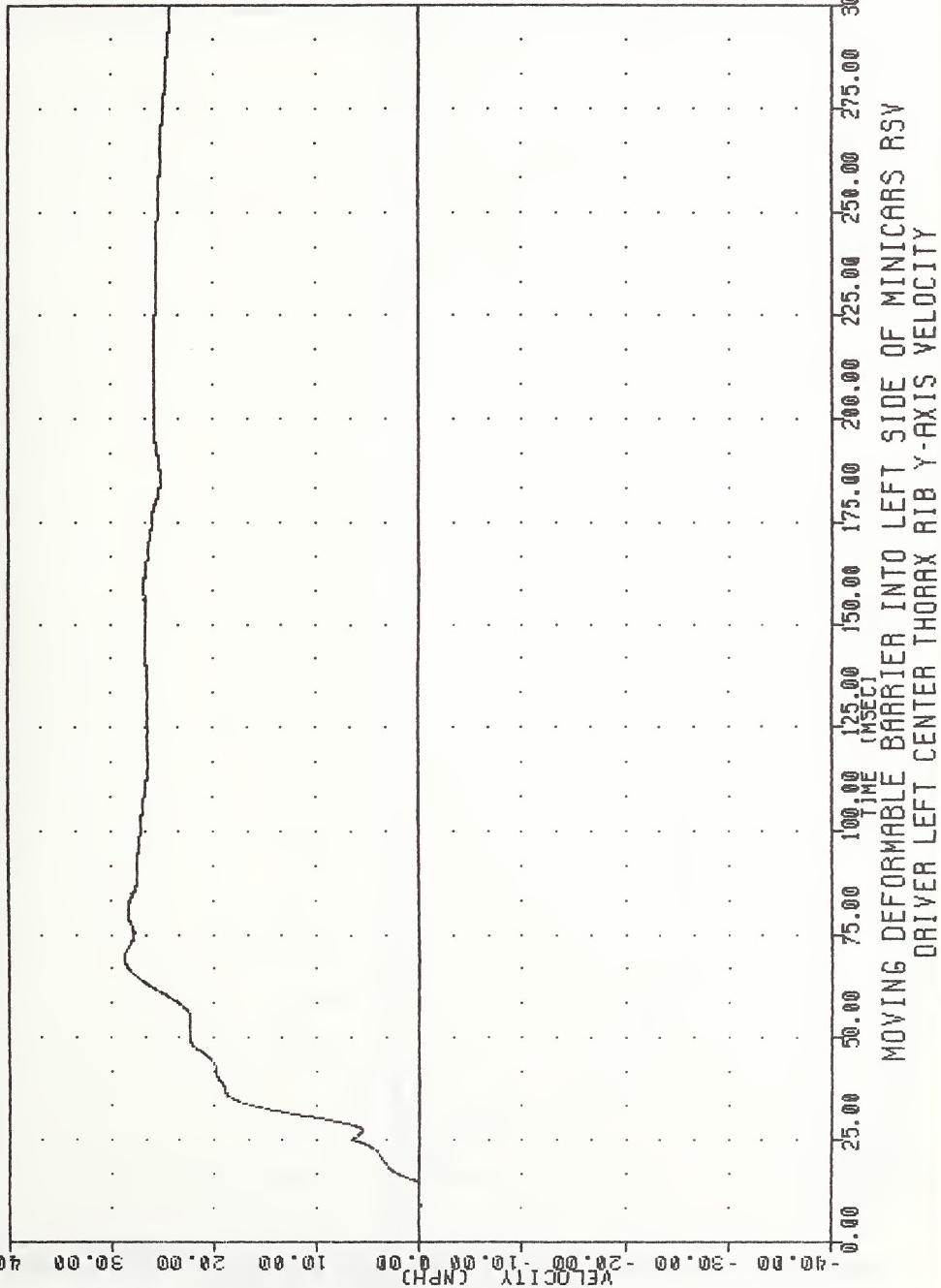


VRTC
LEFT SIDE IMPACT
91140

LCRYV1

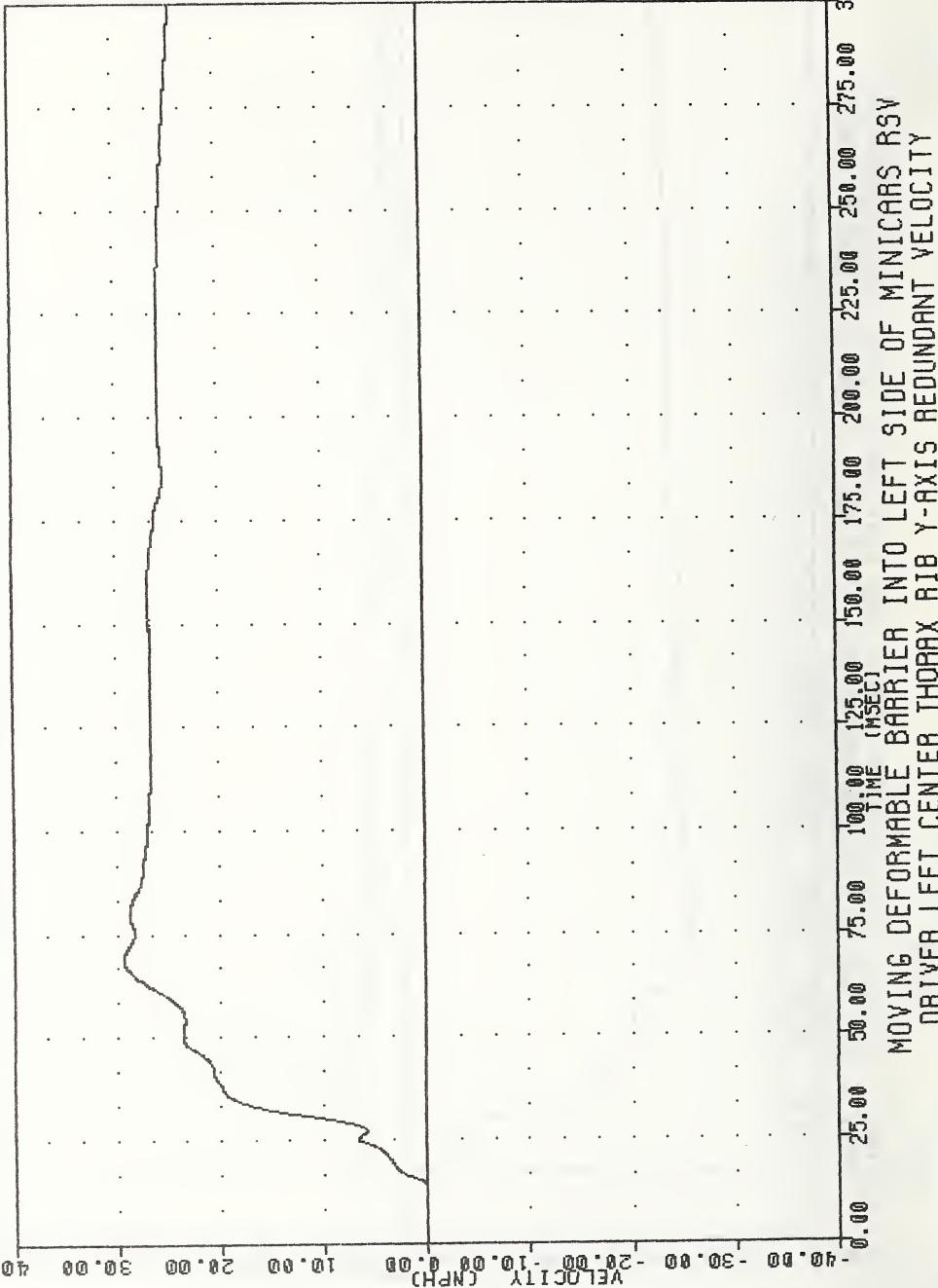
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.098 8.88 ,

28.71 e 69.13



YRTC
LEFT SIDE IMPACT
9114@
LCRYVA

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.0008 0.50 , 29.40 e 68.88

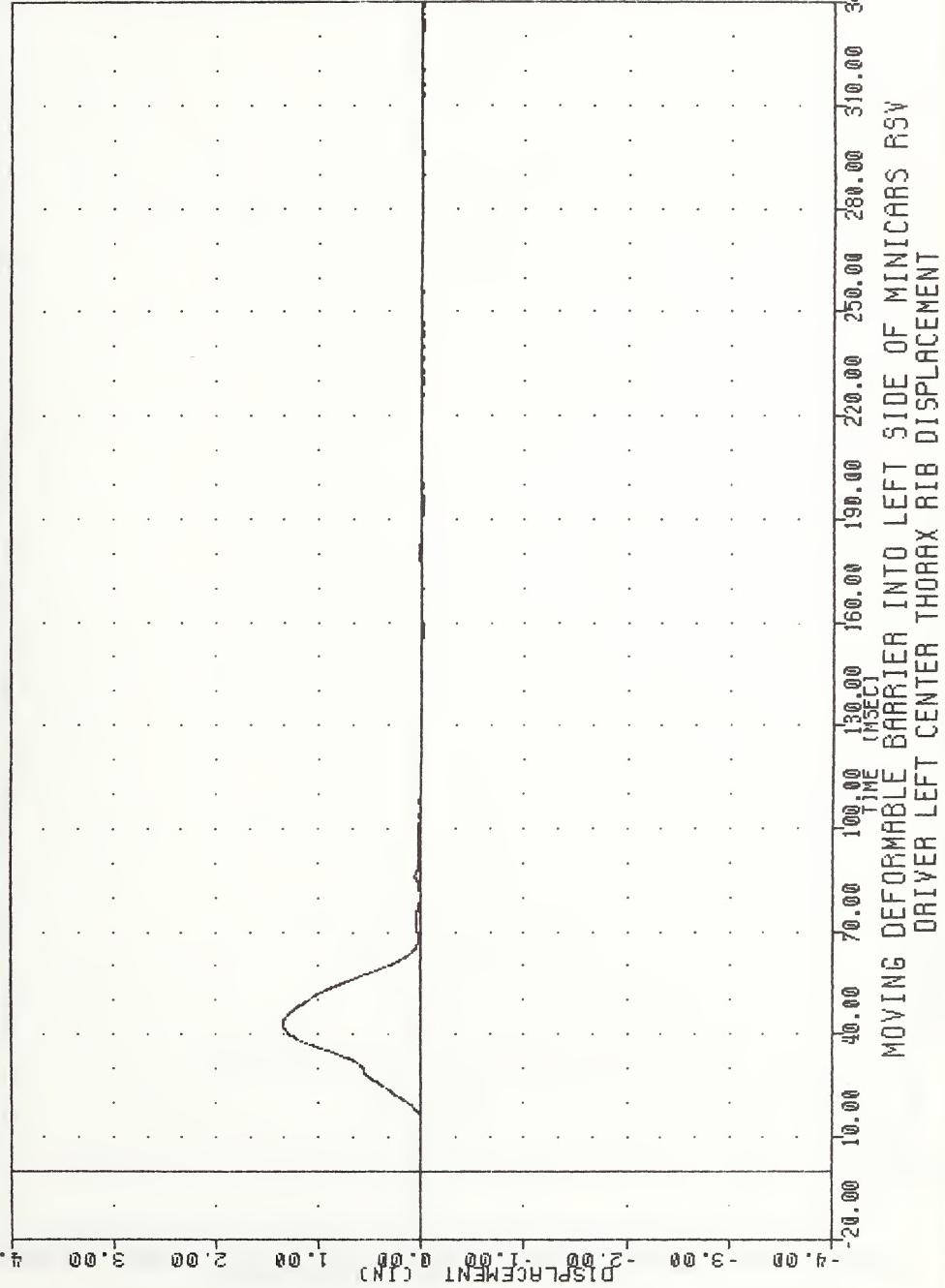


VRTC
LEFT SIDE IMPACT
9114@

LCRY01

FILTER = BLFF
MIN., MAX. VALUES = 300/ 949/
-0.01@ 229.88 ,

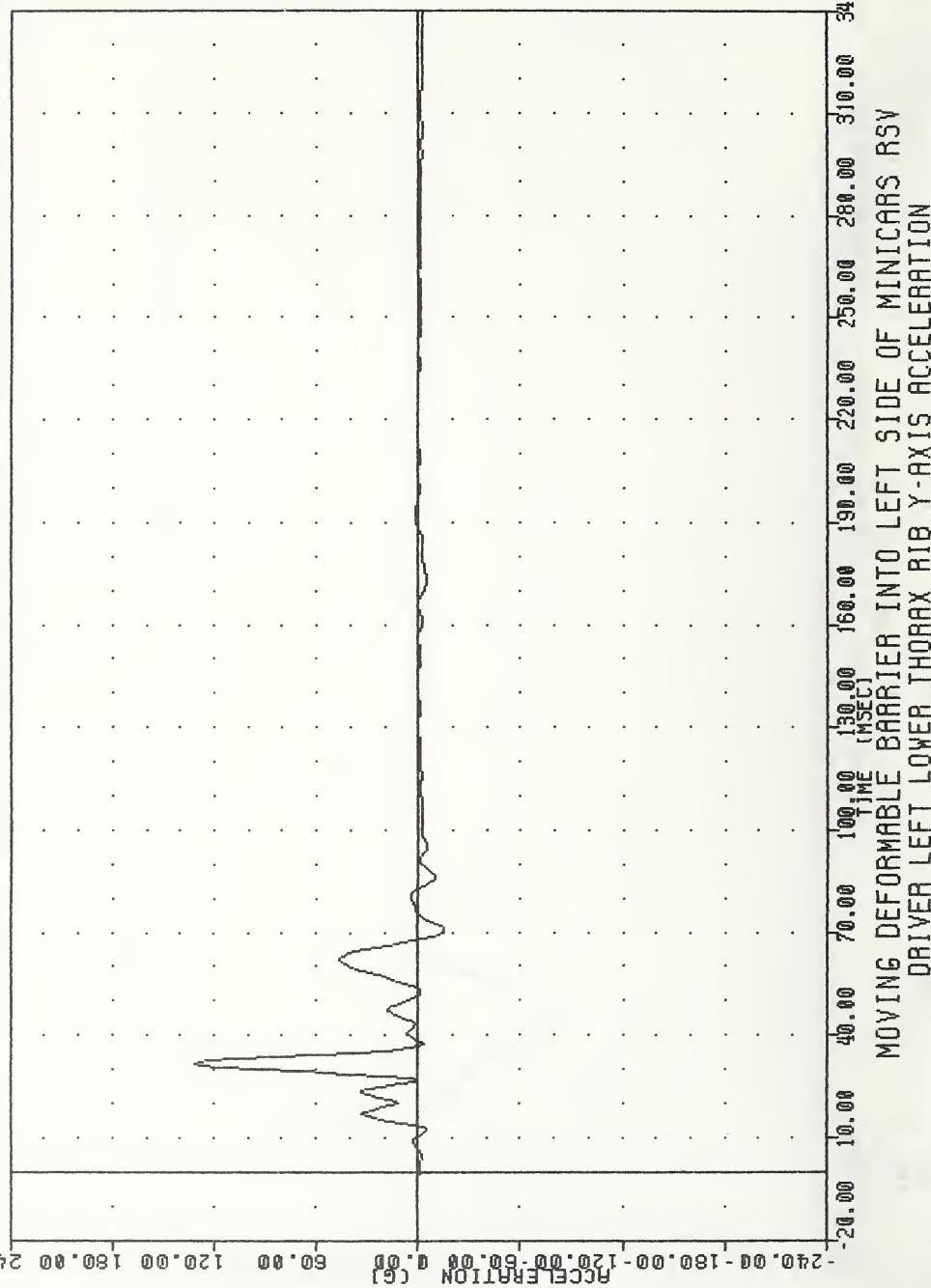
1.35 @ 43.00



-21.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT CENTER THORAX RIB DISPLACEMENT

VRTC 910520
LEFT SIDE IMPACT
9114@ LLRY61

FILTER = HSRI 136/ 189/ -5@
MIN, MAX VALUES = -15.35@ 70.63 , 131.73 @ 31.86

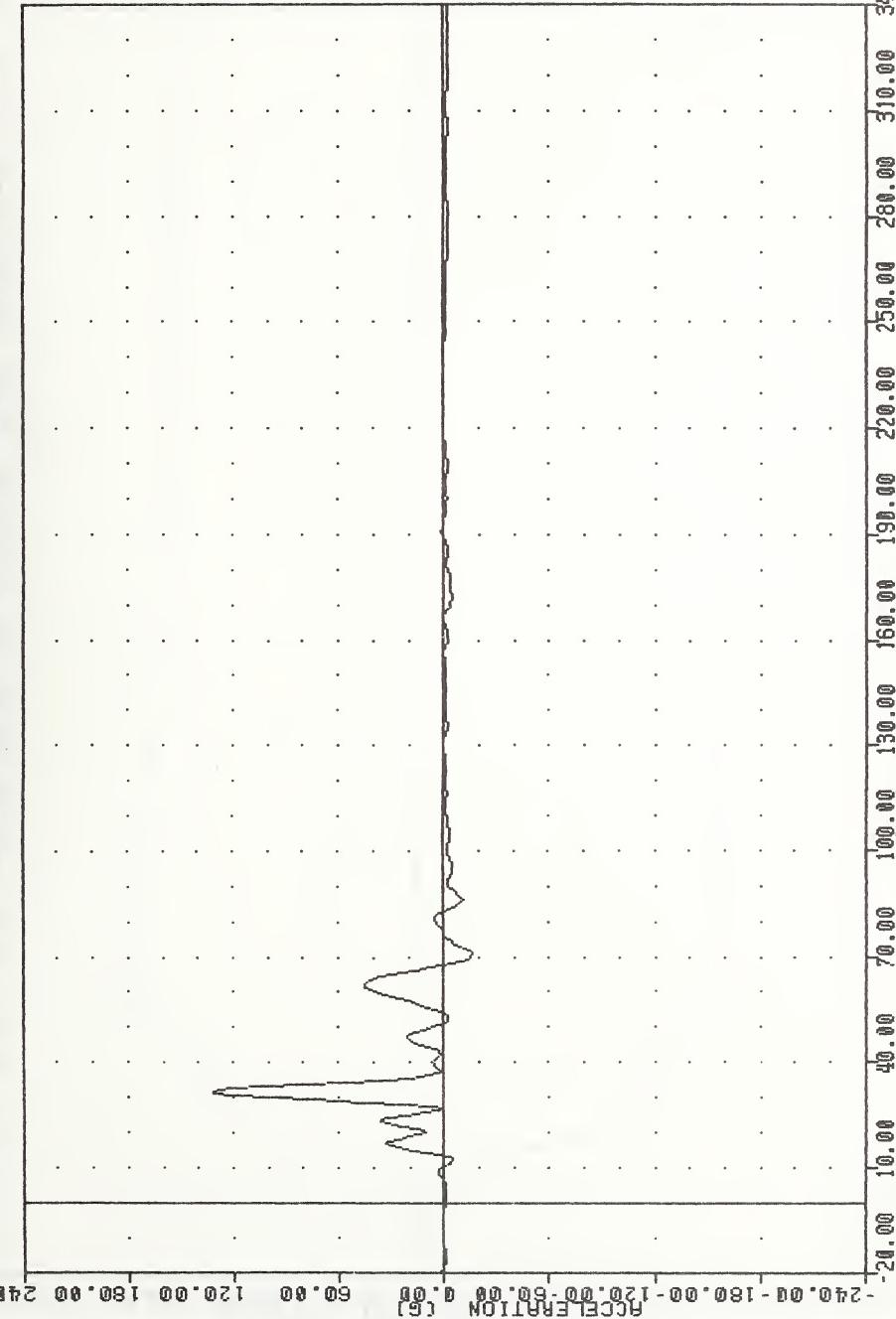


YRTC
910520

LEFT SIDE IMPACT

9114@
LLRGA

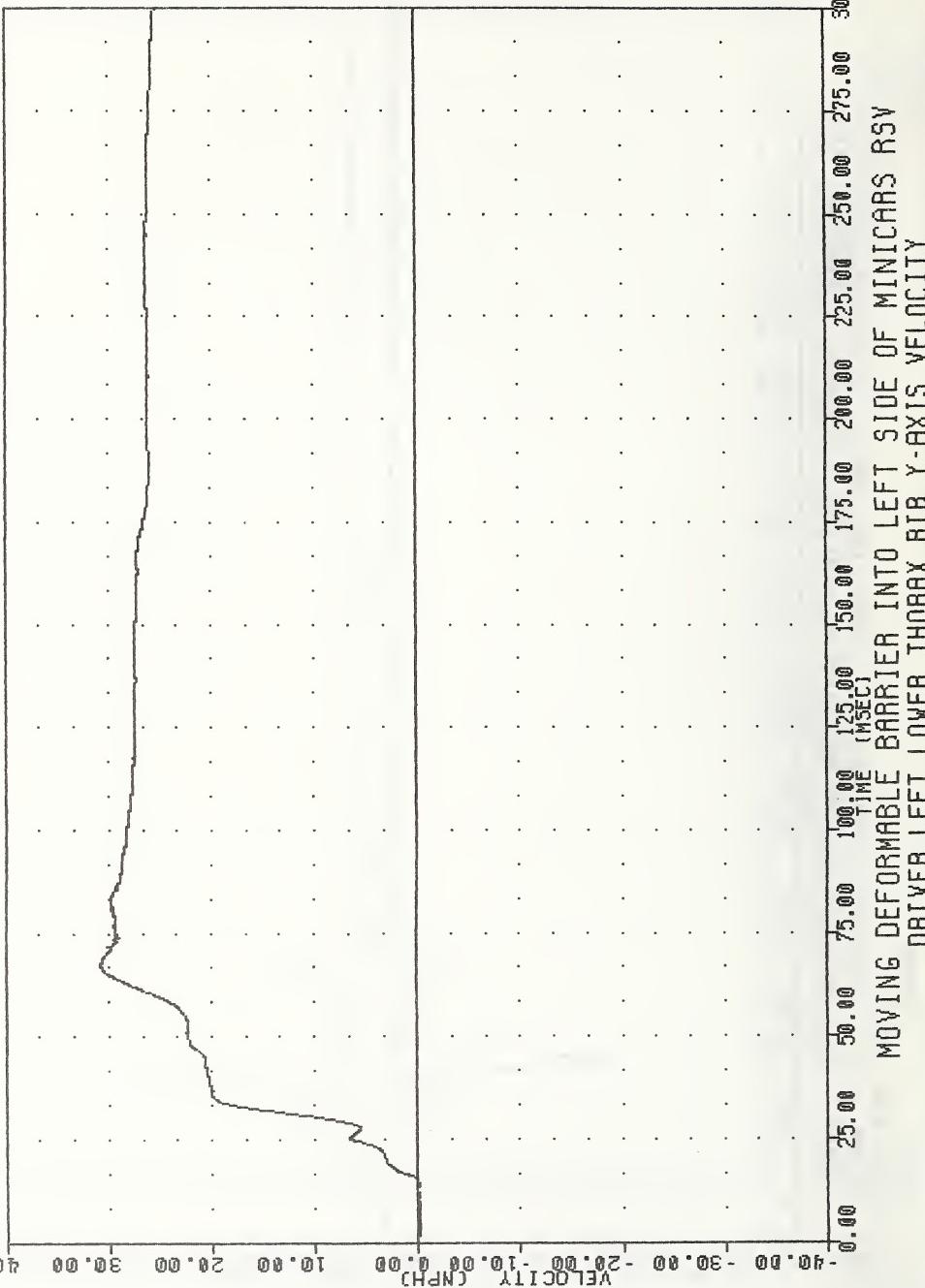
FILTER = HSRI
MIN., MAX VALUES = 136/ 189/-50
-16.25@



-240.00 -180.00 -120.00 -60.00 60.00 120.00 180.00 240.00
-240.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
ACCELERATION (G's)
TIME (msec)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT LOWER THORAX RIB Y-AXIS REDUNDANT ACCELERATION

VRTC
LEFT SIDE IMPACT
91140
LLRYV1

FILTER = ALPPF 1650/ 5214/-40
MIN. MAX VALUES = -0.178 7.13 , 30.73 & 67.50

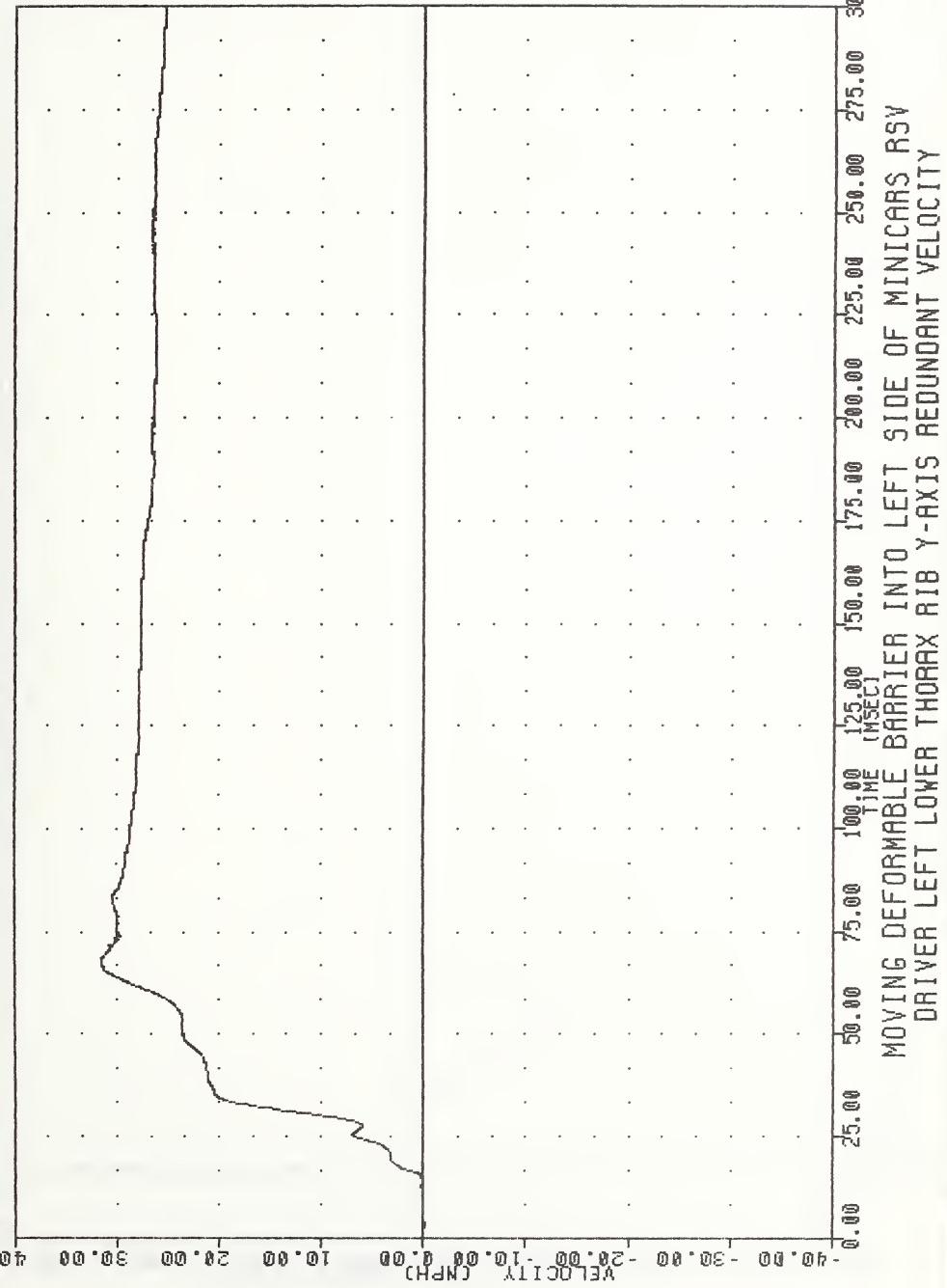


VRTC : 910520
LEFT SIDE IMPACT
91140

LLRYA

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.068 2.63 ,

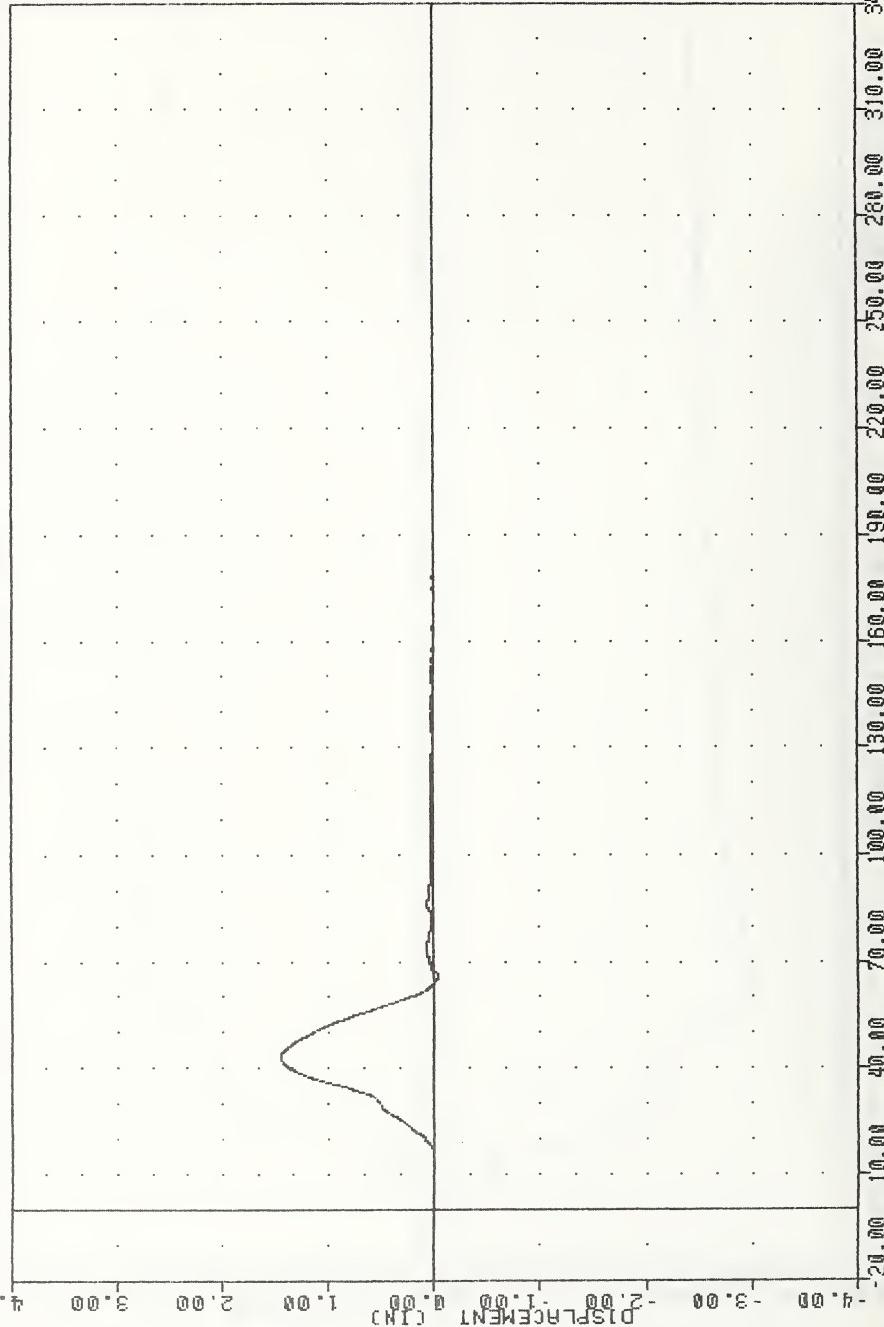
31.48 e 67.38



YRTC : 91052@
LEFT SIDE IMPACT
9114@
LLRD01

FILTER = BLPF
MIN., MAX VALUES = -0.04@
949/-40

66.00 ,
1.45 @
42.88

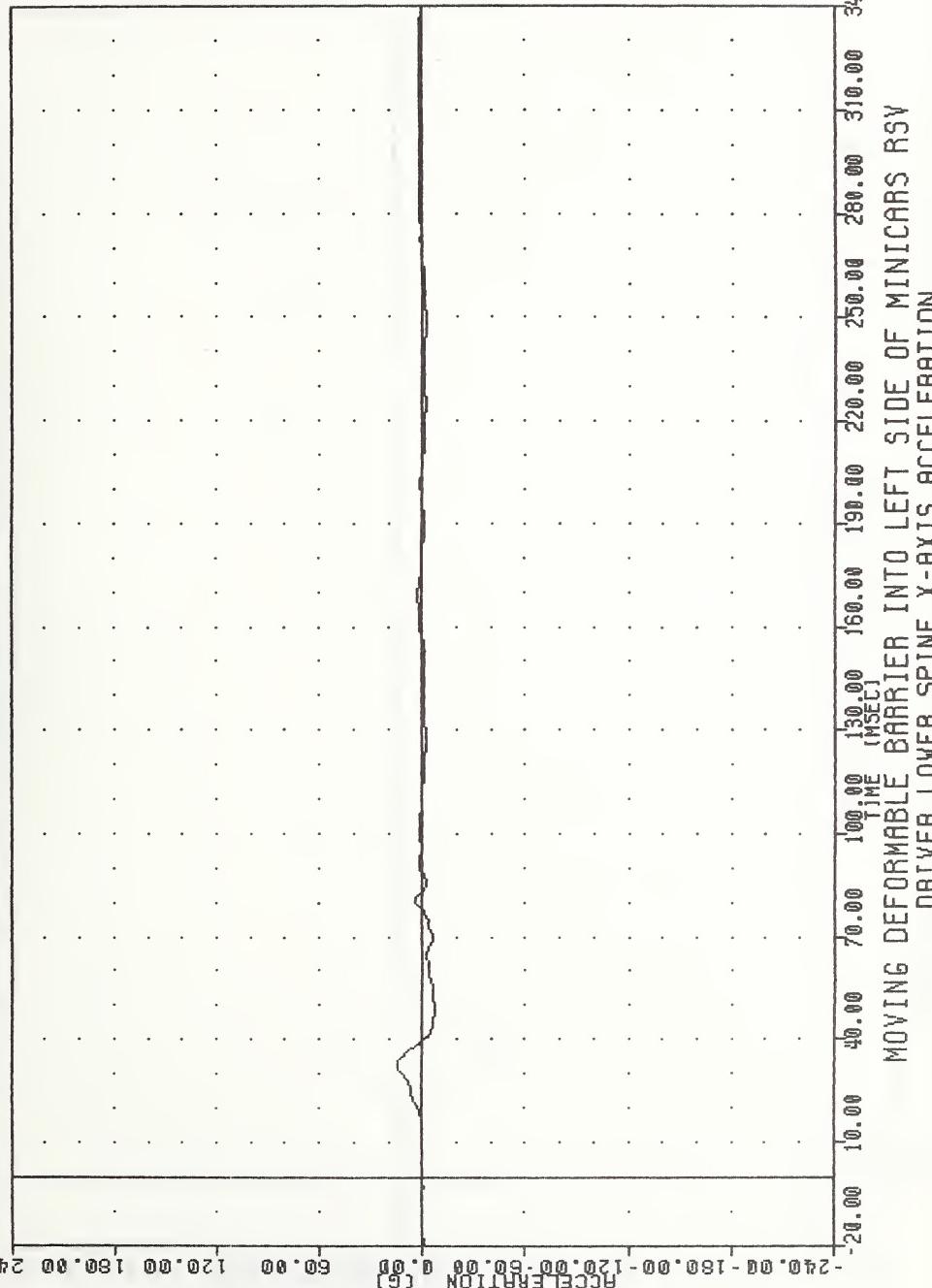


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT LOWER THORAX RIB DISPLACEMENT

VRTC
LEFT SIDE IMPACT

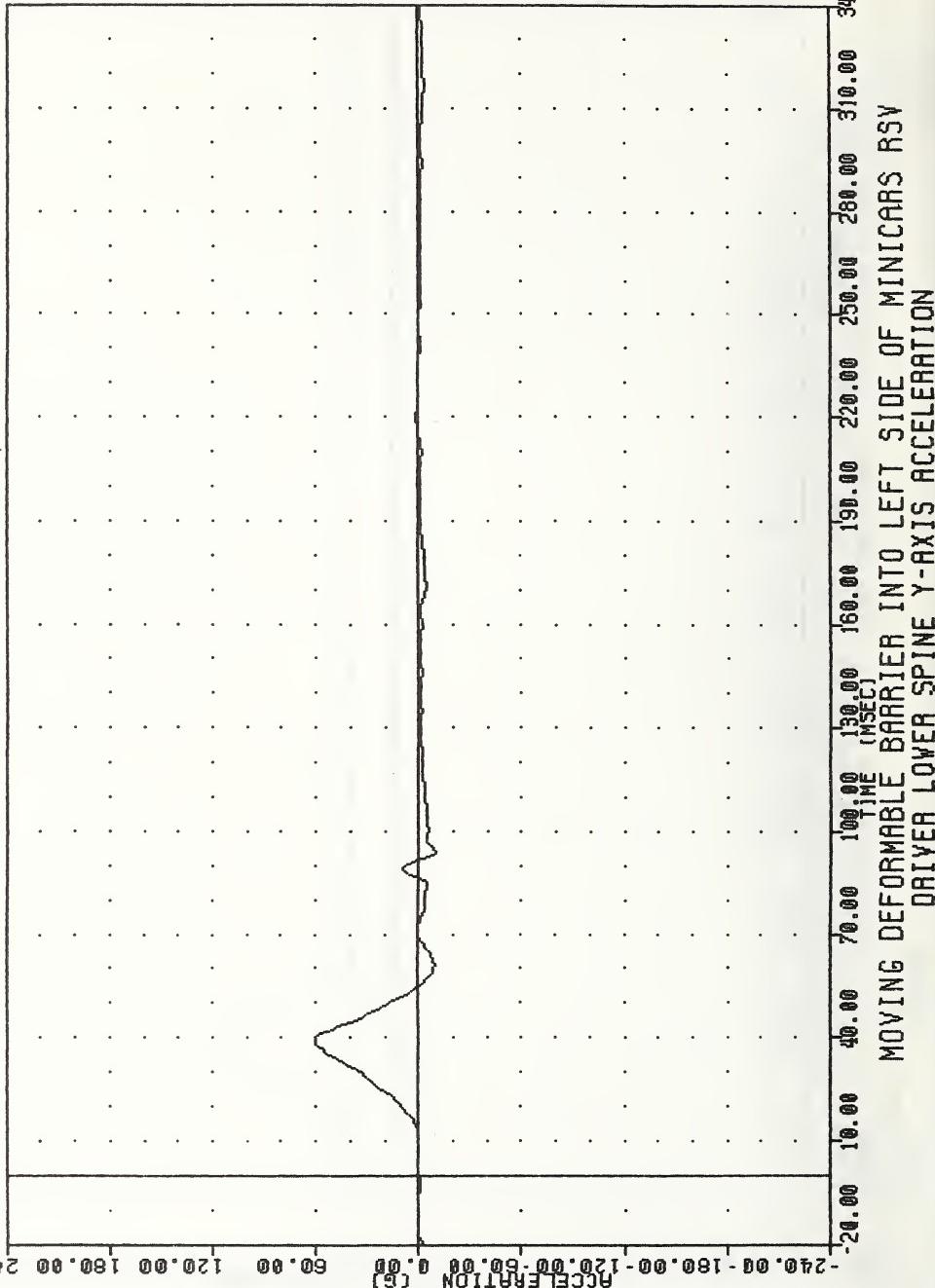
91140
112X61

910520
FILTER = HSRI
MIN. MAX VALUES = -7.90 & 48.75 ,
14.49 & 32.50



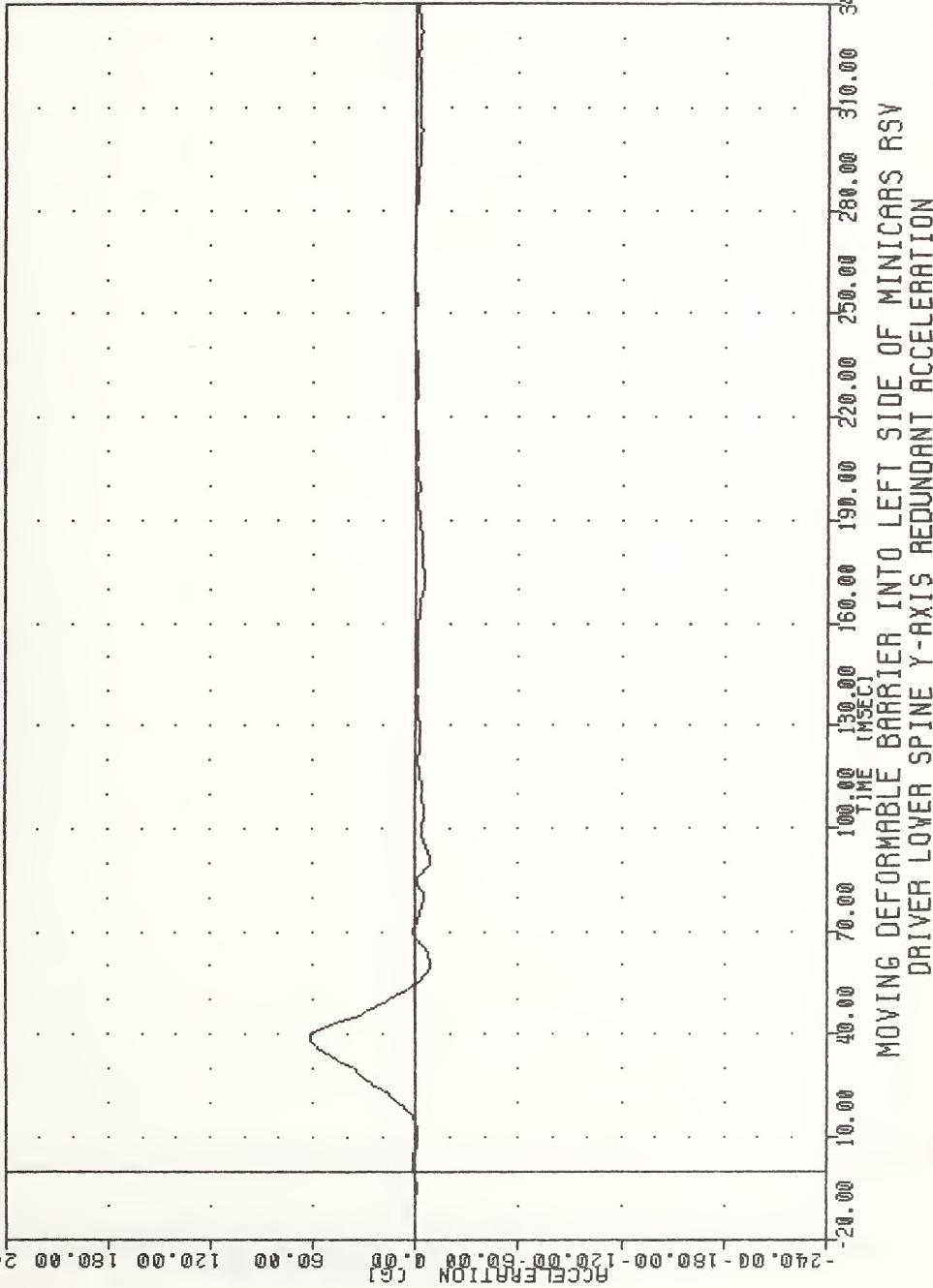
VRTC
LEFT SIDE IMPACT
9114@
T12Y61

MIN, MAX VALUES = -9.58@ 136/ 189/ -5@
91.00 39.36



VRTC
LEFT SIDE IMPACT
9114@
T12Y6@

910520
MIN, MAX VALUES = -8.79@ 90.62@
FILTER = HSRI 136/ 189/ -5@



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LOWER SPINE Y-AXIS REDUNDANT ACCELERATION

YRTC
LEFT SIDE IMPACT
91140
T12Z61

FILTER = HSRI 136/ -50
MIN. MAX VALUES = -5.400 63.13 ,
20.57 e 39.38

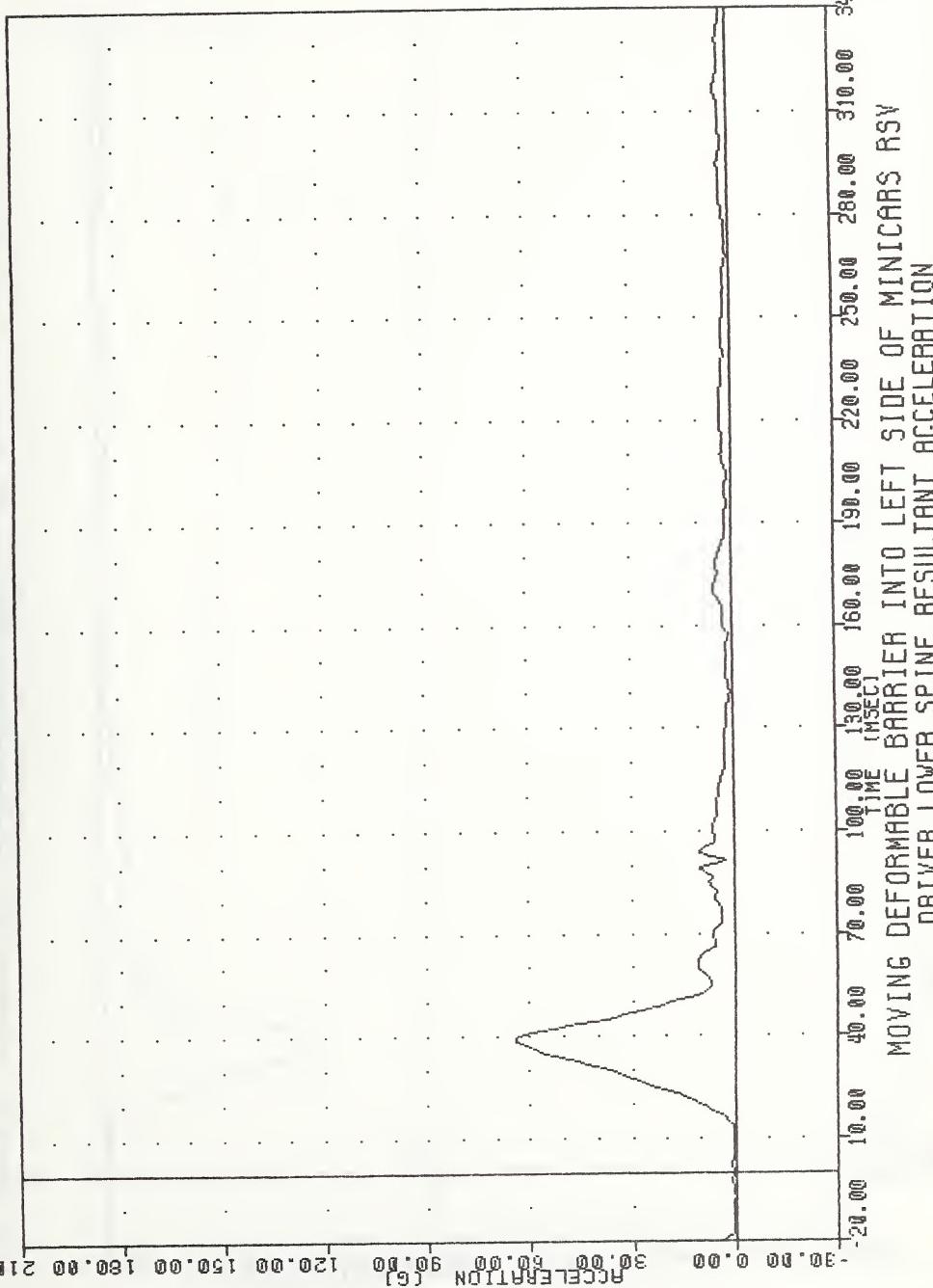
-240.00 -180.00 -120.00 -60.00 60.00 120.00 180.00 240.00

ACCELERATION (G)

-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (INSEC.)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LOWER SPINE Z-AXIS ACCELERATION

VRTC , 910520
LEFT SIDE IMPACT
91140
T12RG1

FILTER = HSRI 136/ 189/-50
MIN, MAX VALUES = 0.068 -7.50 .
63.91 e 39.38



TIME (ms)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LOWER SPINE RESULTANT ACCELERATION

9140
LEFT SIDE IMPACT
WTC 9/11/2001

FILTER = HSR1 1.36/ -189 / -50
 MIN. MAX VALUES = 0.05 & -8.13 ;
 65.03 € 39.38

11296

QD = Q

ACCELERATION (G)

TIME (MSEC)

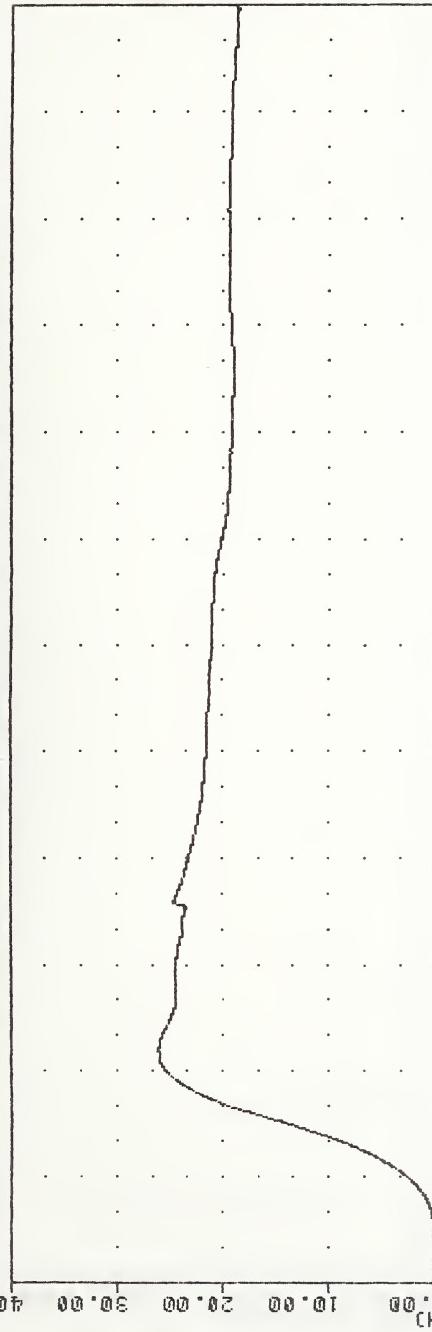
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LOWER SPINE REDUNDANT RESULTANT ACCELERATION

Time (msec)	Lower Acceleration (G)	Upper Acceleration (G)
20.00	0.00	0.00
40.00	10.00	10.00
60.00	30.00	30.00
80.00	60.00	60.00
100.00	100.00	100.00
120.00	130.00	130.00
130.00	160.00	160.00
140.00	180.00	180.00
150.00	190.00	190.00
160.00	200.00	200.00
170.00	210.00	210.00
180.00	220.00	220.00
190.00	230.00	230.00
200.00	240.00	240.00
210.00	250.00	250.00
220.00	260.00	260.00
230.00	270.00	270.00
240.00	280.00	280.00
250.00	280.00	280.00
260.00	280.00	280.00
270.00	280.00	280.00
280.00	280.00	280.00
290.00	280.00	280.00
300.00	280.00	280.00
310.00	280.00	280.00
320.00	280.00	280.00
330.00	280.00	280.00
340.00	280.00	280.00

VRTC
LEFT SIDE IMPACT
9114@
T12YV1

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.028 1.00 .

26.05 . 55.00

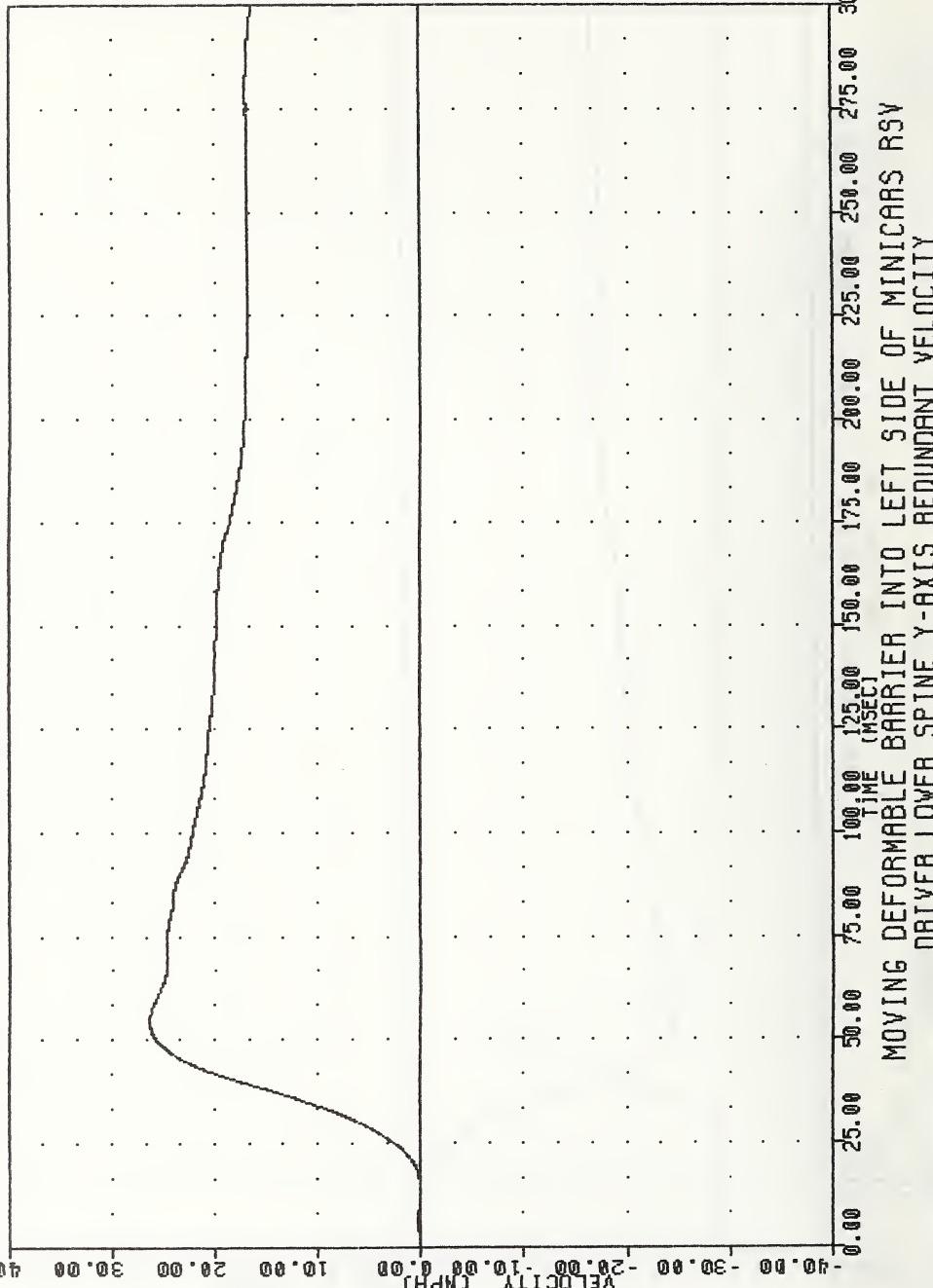


VELOCIT Y (MSEC)
-40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00 30.00 40.00
TIME (MSEC)

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LOWER SPINE Y-AXIS VELOCITY

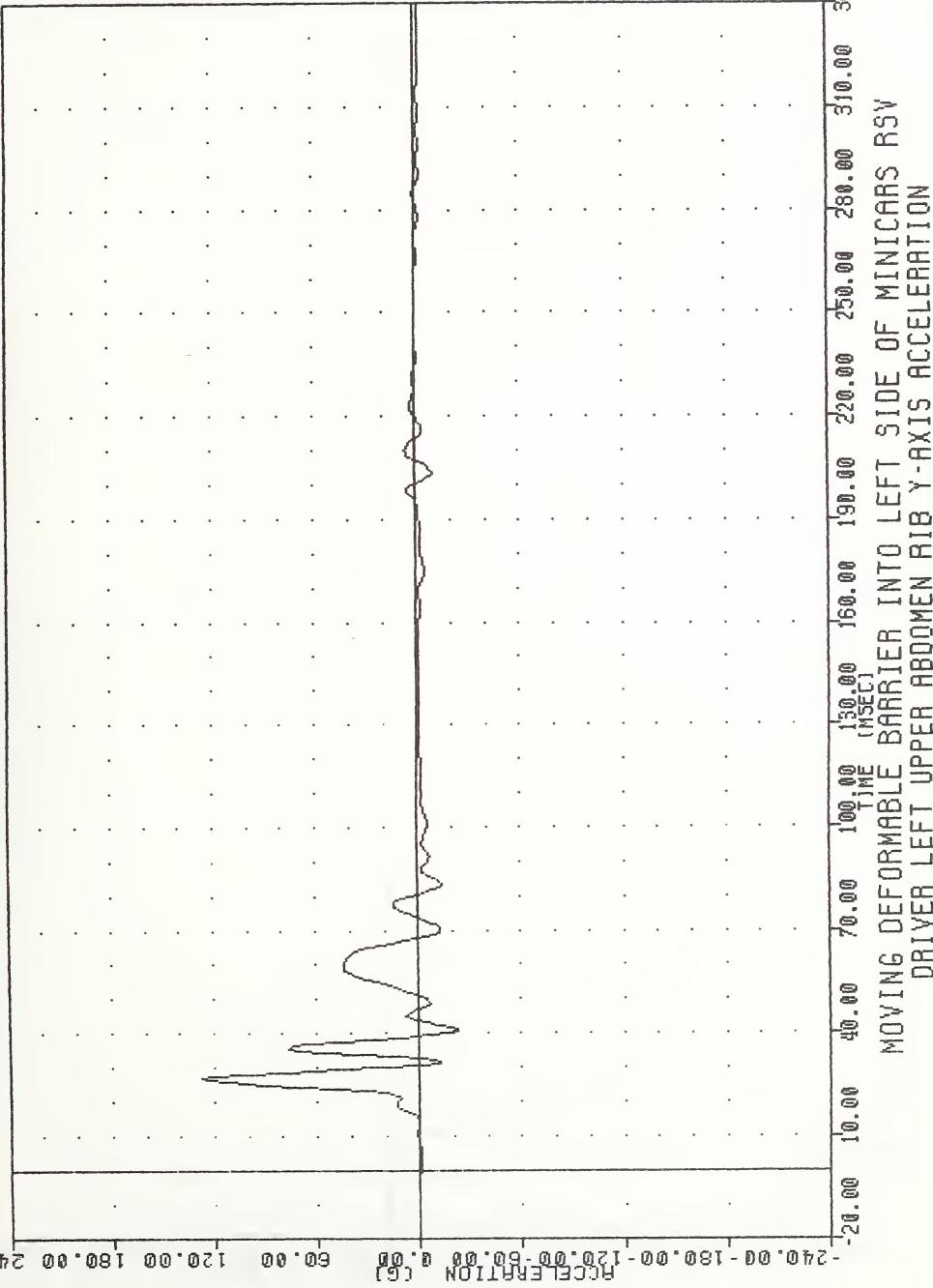
VRTC '910520
LEFT SIDE IMPACT
91140
712YVA

FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = 0.000 0.13 ,
26.33 e 54.13

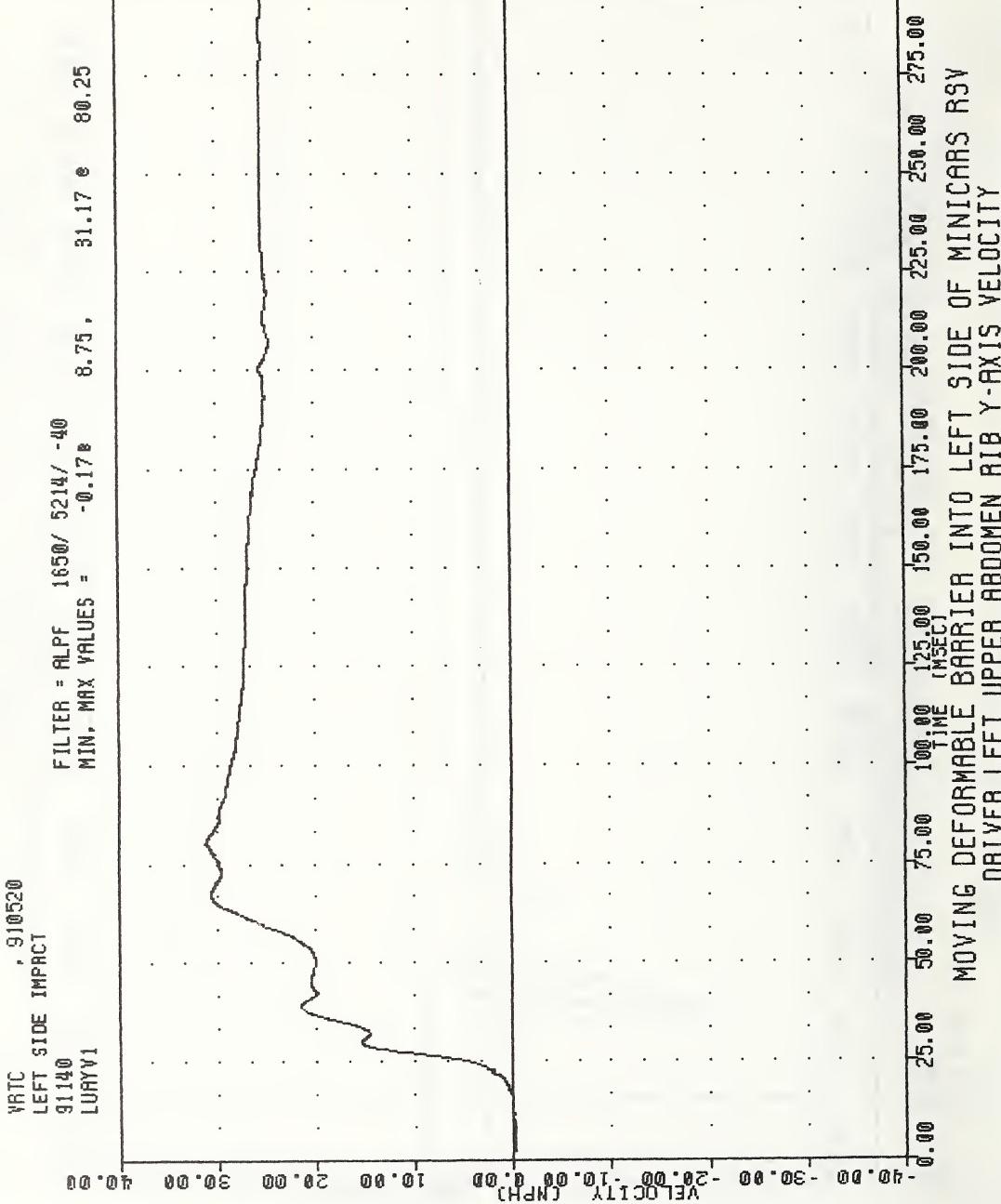


VRTC 910520
LEFT SIDE IMPACT
9114@
LUHY61

FILTER = HSRI 136/ 189 / -5@
MIN. MAX VALUES = -22.72@ 40.63 ,
127.92 @ 26.87



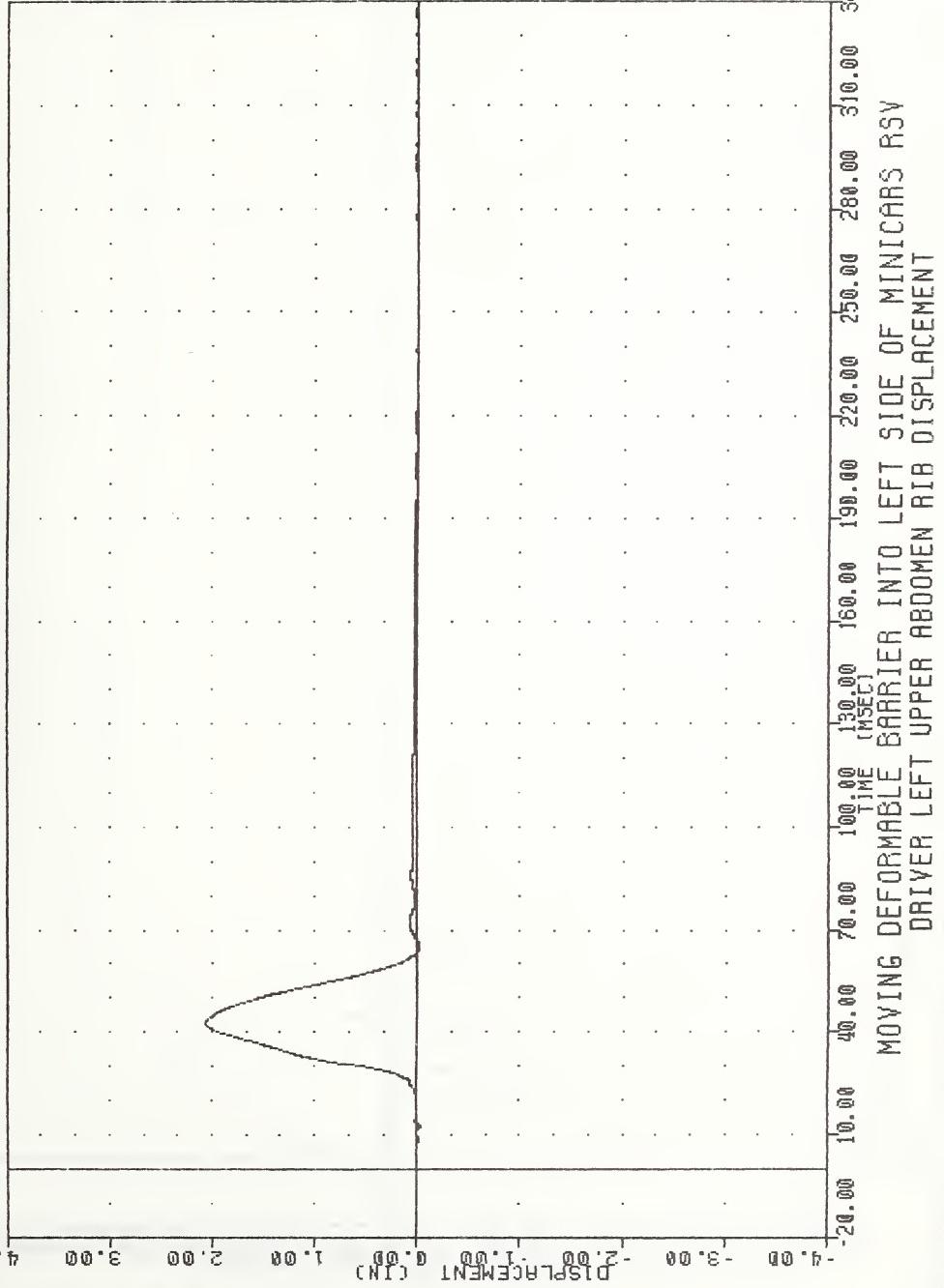
YRTC
LEFT SIDE IMPACT
91140
LURVY1



VRTC
LEFT SIDE IMPACT
91140
LURAYI

MIN. MAX VALUES = -0.048 12.38 , 2.06 e 42.63

FILTER = BLPF 300/ 949 / -40

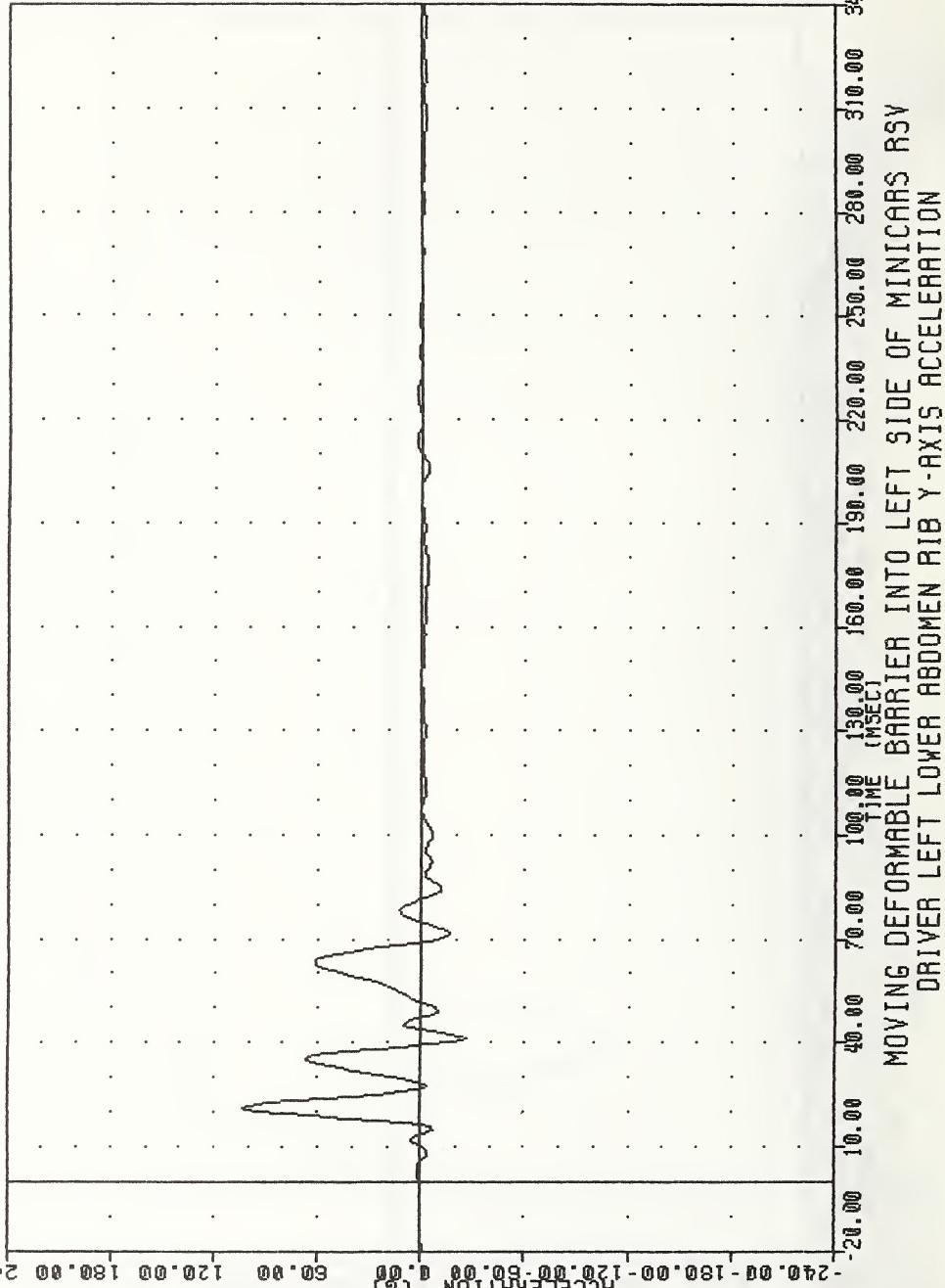


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT UPPER ABDOMEN RIB DISPLACEMENT

VRTC
LEFT SIDE IMPACT
91140
LLAYG1

910520
FILTER = HSR1 136/ 189/ -50
MIN, MAX VALUES = -25.868 41.25 ,
103.92 e 21.25

-240.00 -180.00 -120.00 -60.00 60.00 120.00 180.00 240.00
ACCELERATION (G)

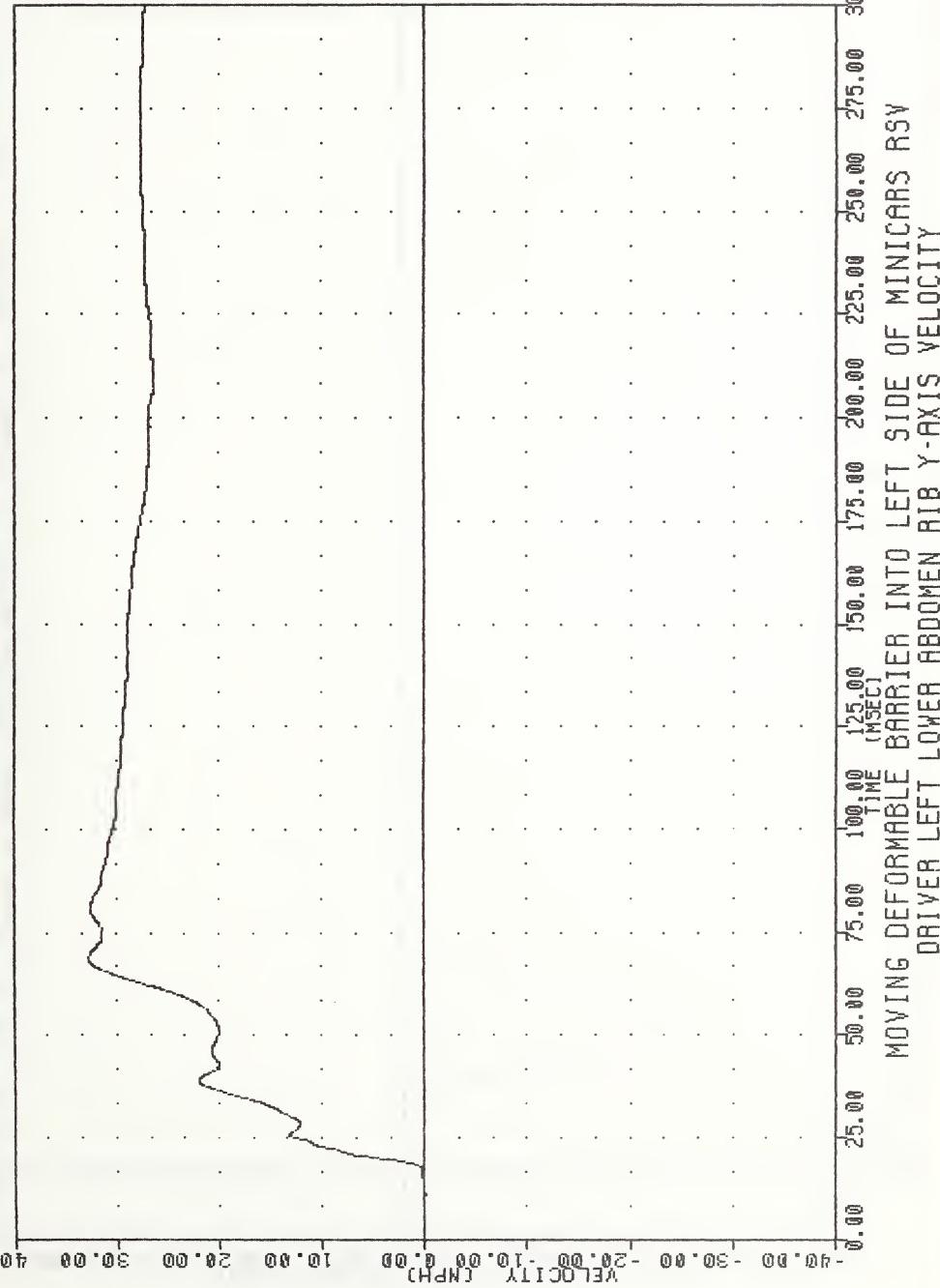


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT LOWER ABDOMEN RIB Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
9114@
LLAYV1

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.088 11.13 ,

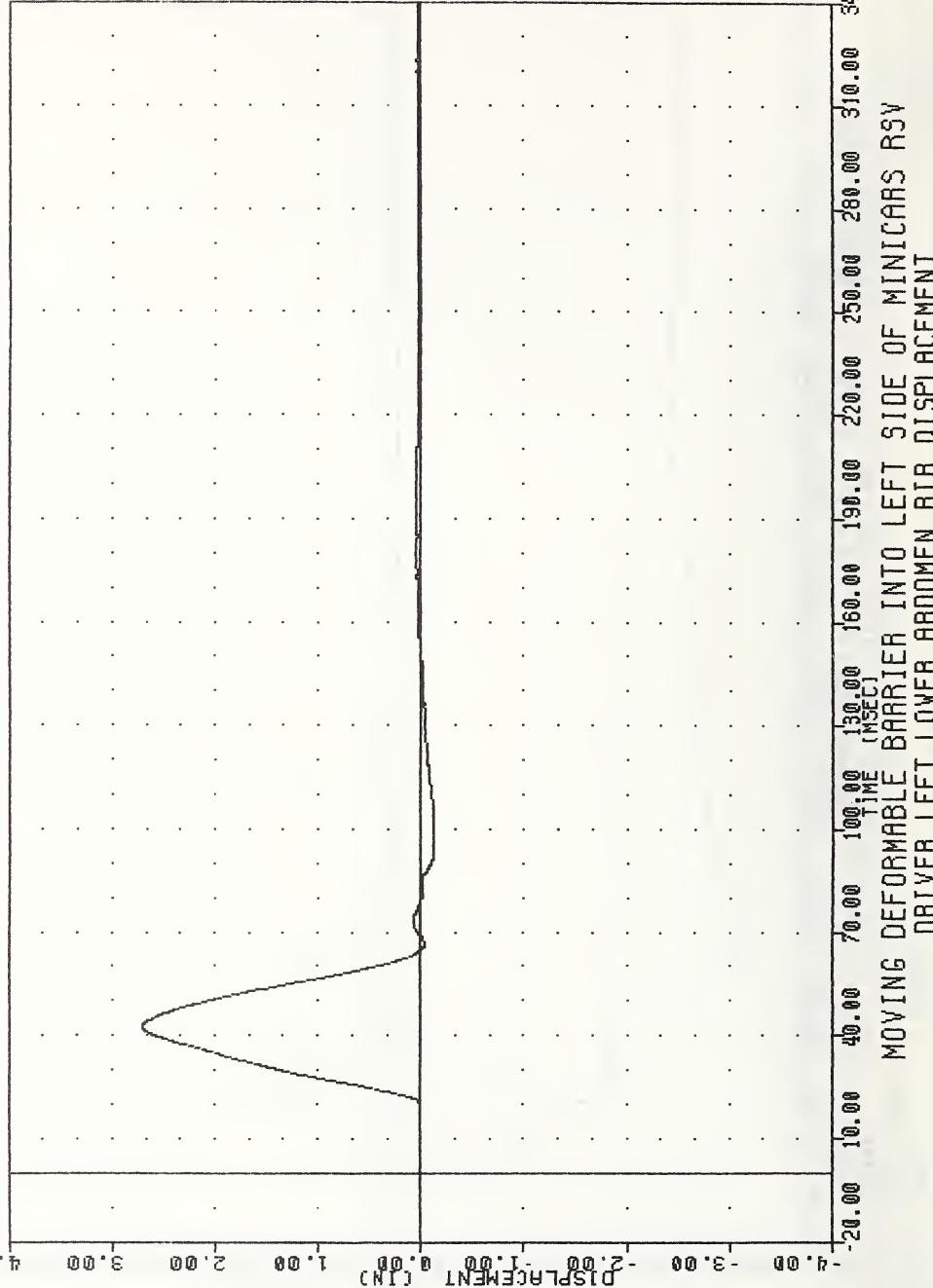
32.74 @ 68.50



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER LEFT LOWER ABDOMEN RIB Y-AXIS VELOCITY

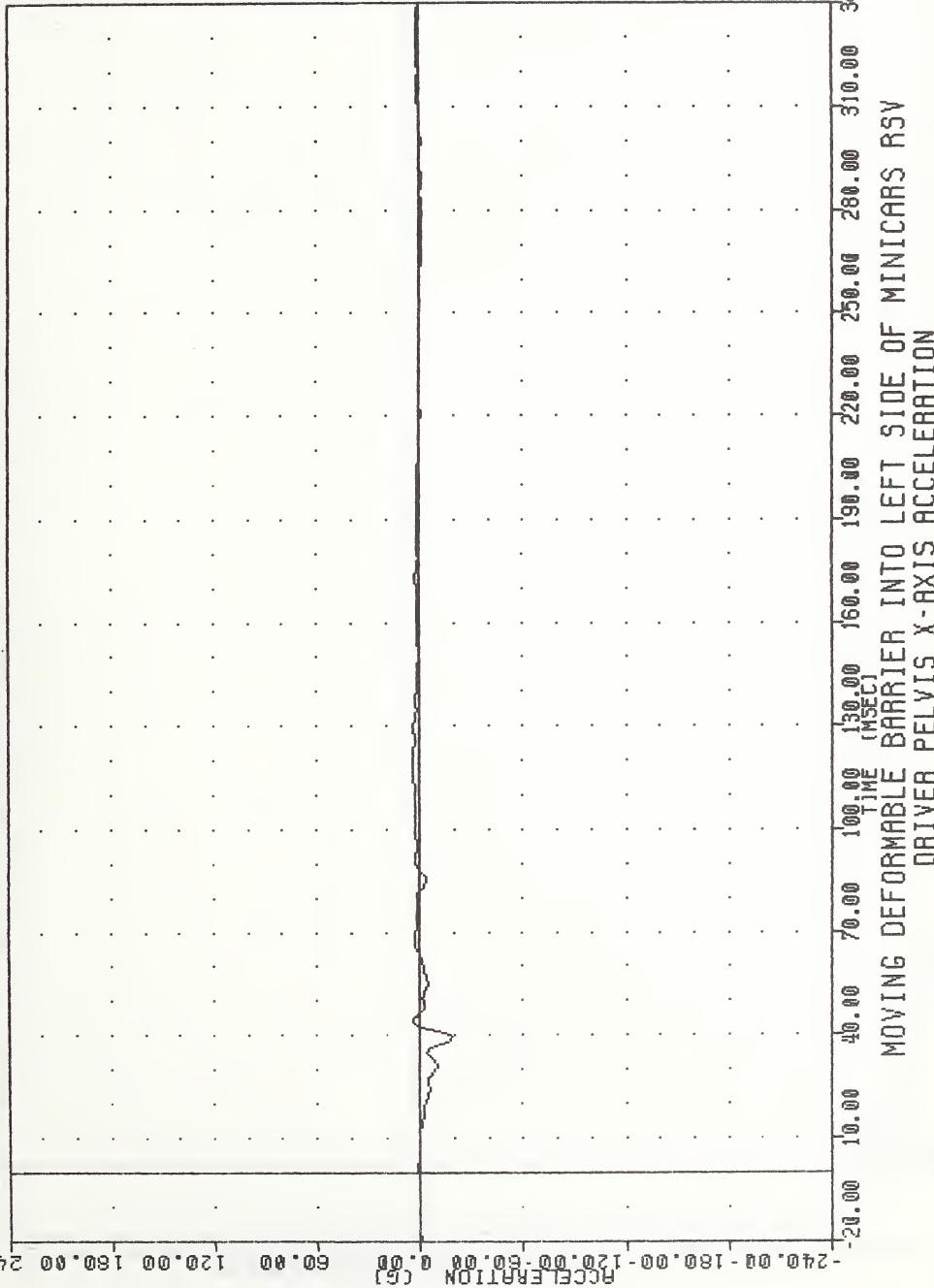
VRTC
LEFT SIDE IMPACT
9114@
LLAY01

FILTER = BLFF 300/
MIN, MAX VALUES = 949/-40
 -0.13@ 97.00 ,
 2.70 @ 42.50



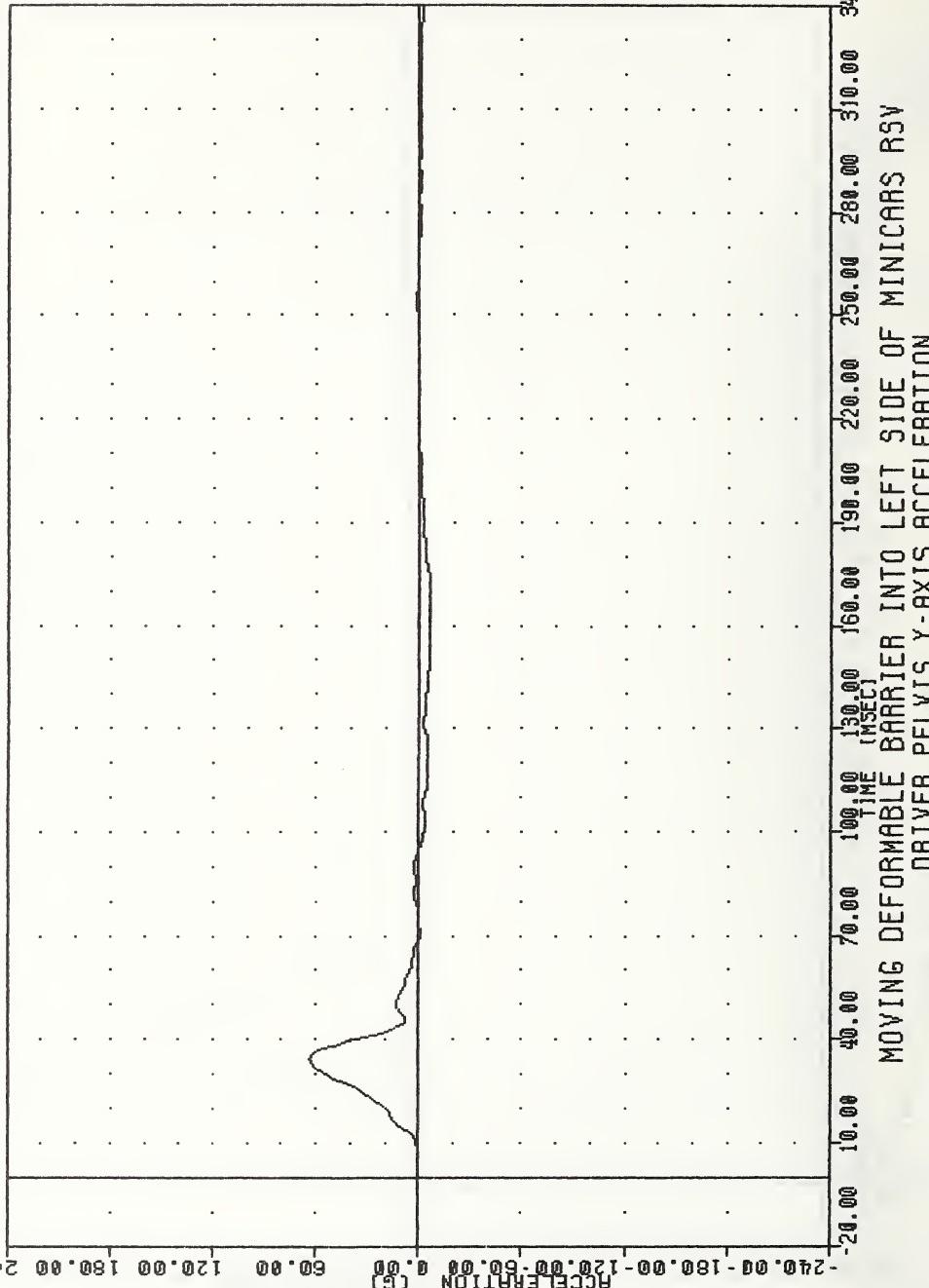
WRIC 910520
LEFT SIDE IMPACT
9114@ PEWYG1

FILTER = HSRI 136/
MIN. MAX VALUES = -18.23@ 39.38 ,
4.54 @ 44.38



VRTC 910520
LEFT SIDE IMPACT
9114@ PEVY61

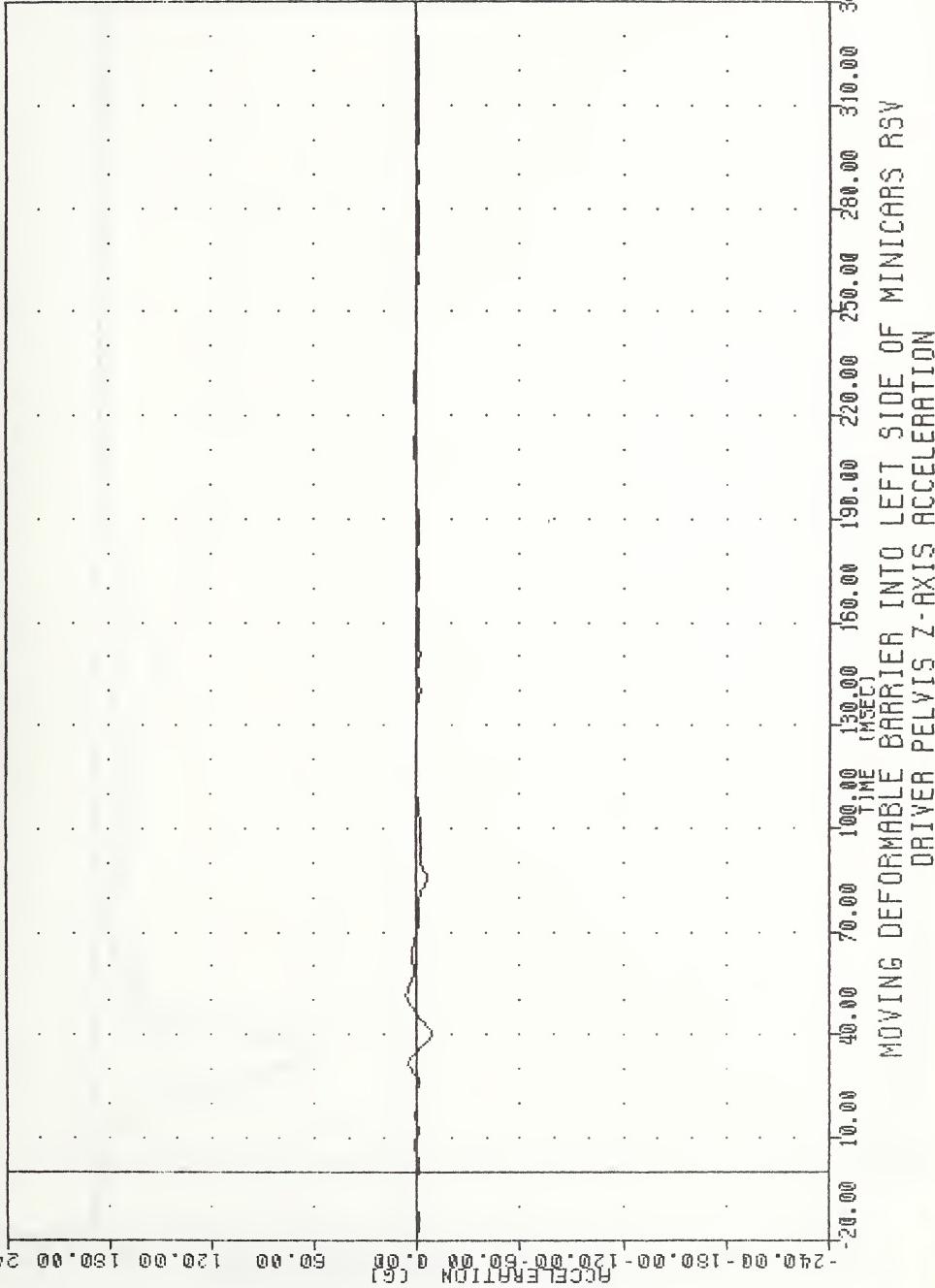
FILTER = HSRI
MIN., MAX VALUES = 136/-189/-50
-6.49@ 160.63@ 63.39@ 34.36



WTC 910520
LEFT SIDE IMPACT
9114@ PEYZ61

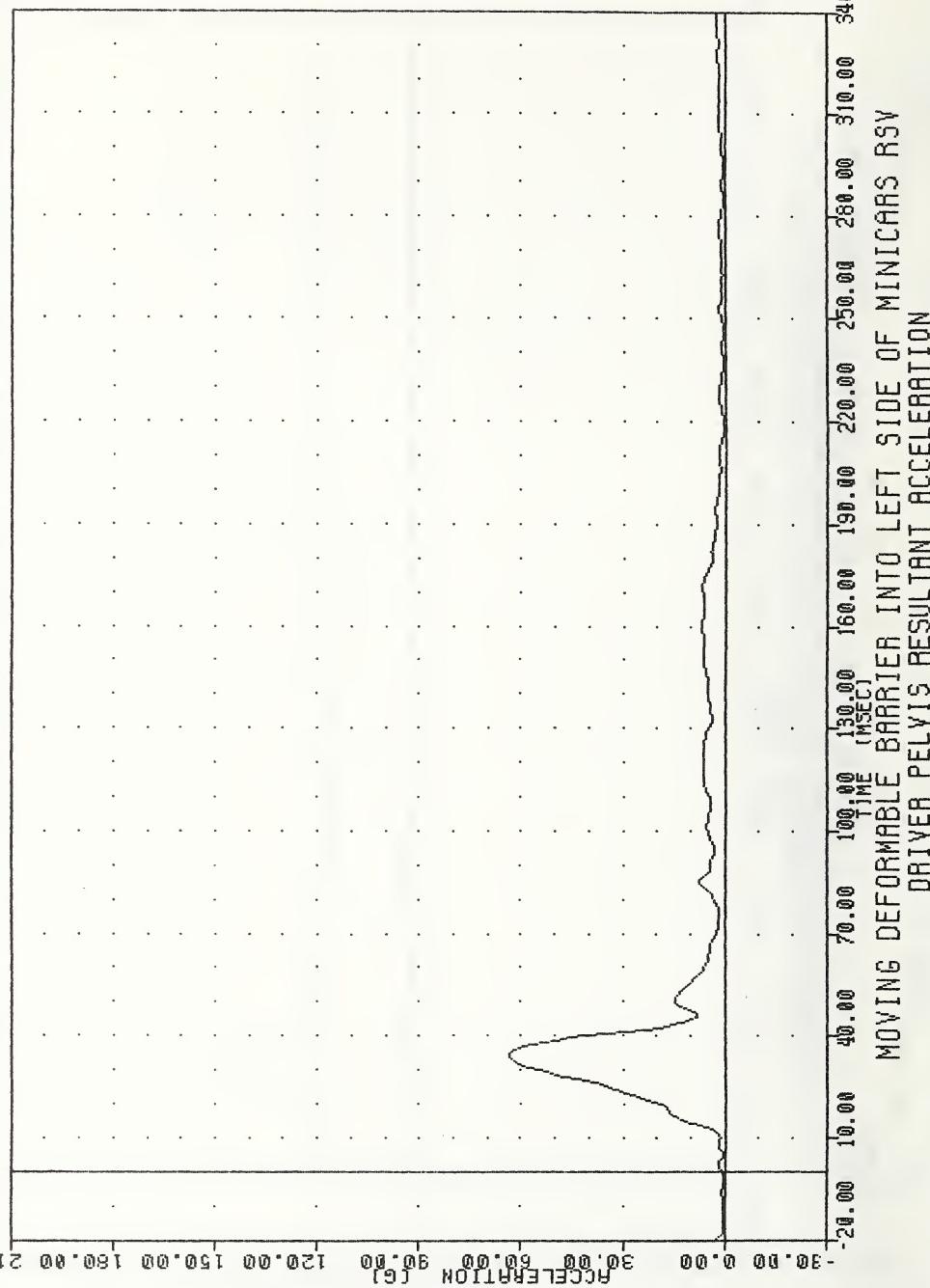
MIN, MAX VALUES = -8.89@ 40.63 ,
FILTER = HSRI 136/ 189/ -5@

6.29 @ 51.25



VRFC
LEFT SIDE IMPACT
9114@
PEVR61

91052@
FILTER = HSRI
MIN, MAX VALUES = 136/-50
0.15@ 217.50 .
63.55 e 34.38



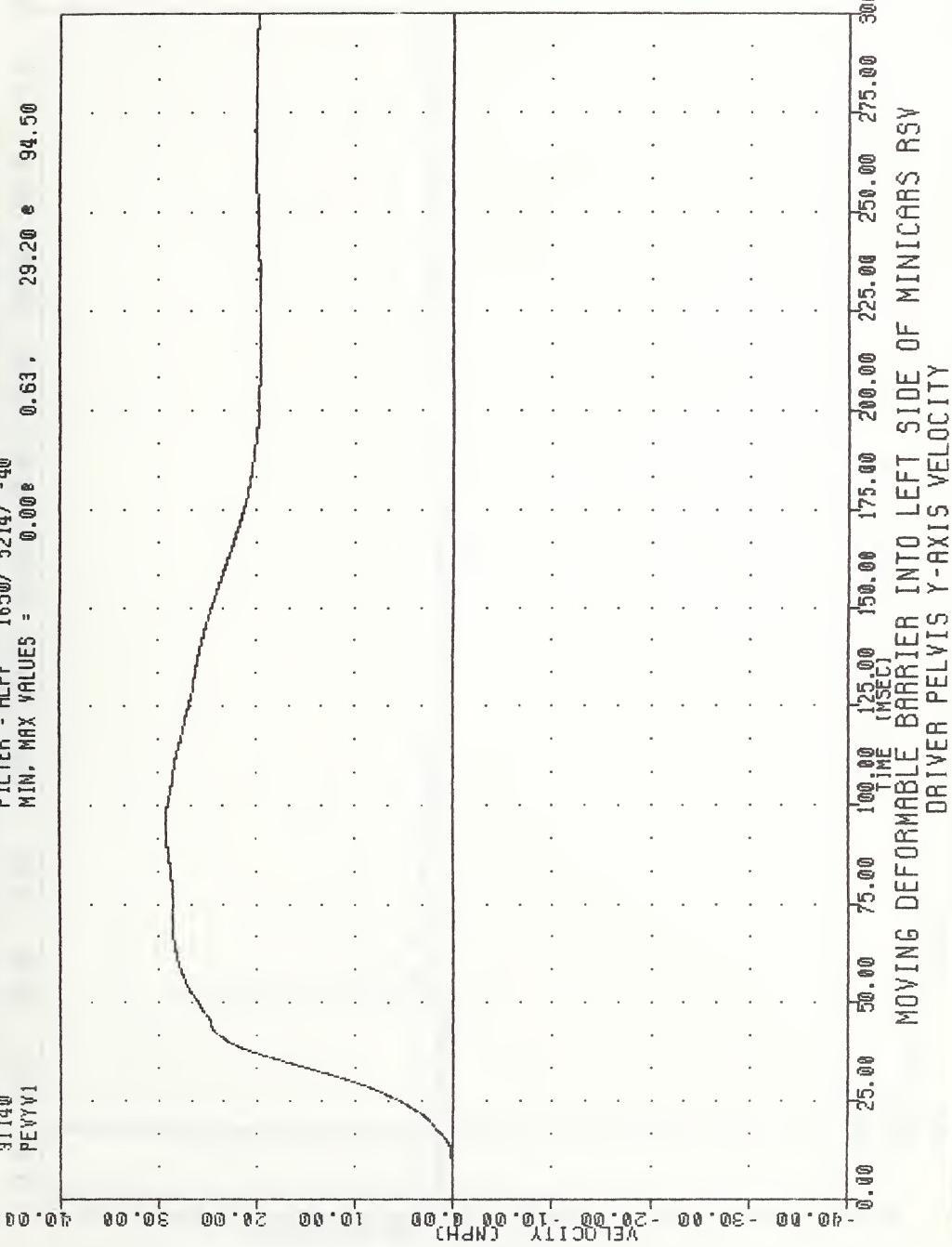
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
DRIVER PELVIS RESULTANT ACCELERATION

VRTC , 910520
LEFT SIDE IMPACT

3114@
PEYYV1

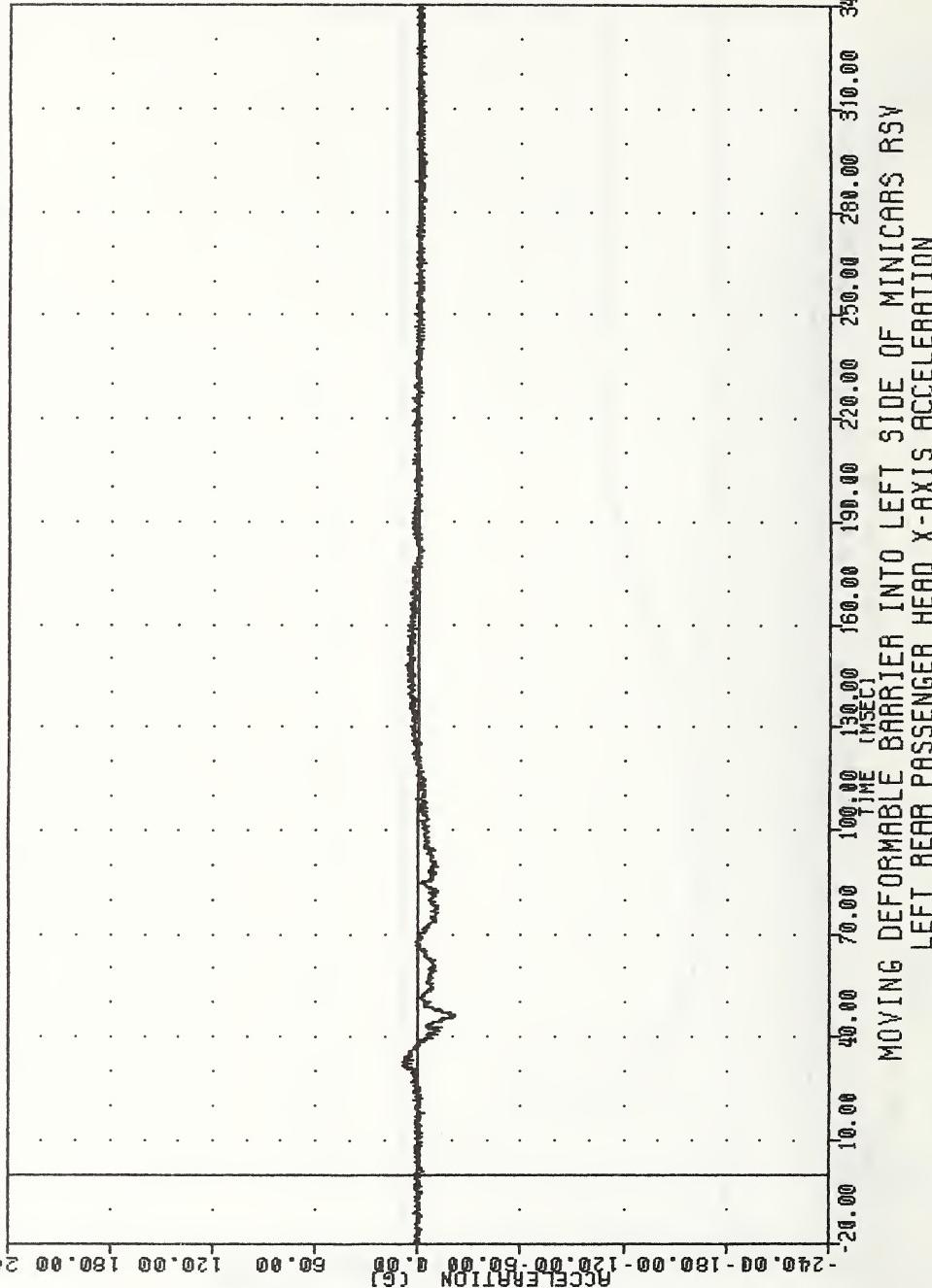
FILTER = ALPF 1650/ 5214/ -4@
MIN. MAX VALUES = 0.00@ 0.63 ,

29.20 @ 94.5@



VRTC 910520
LEFT SIDE IMPACT
91140
HEDXG4

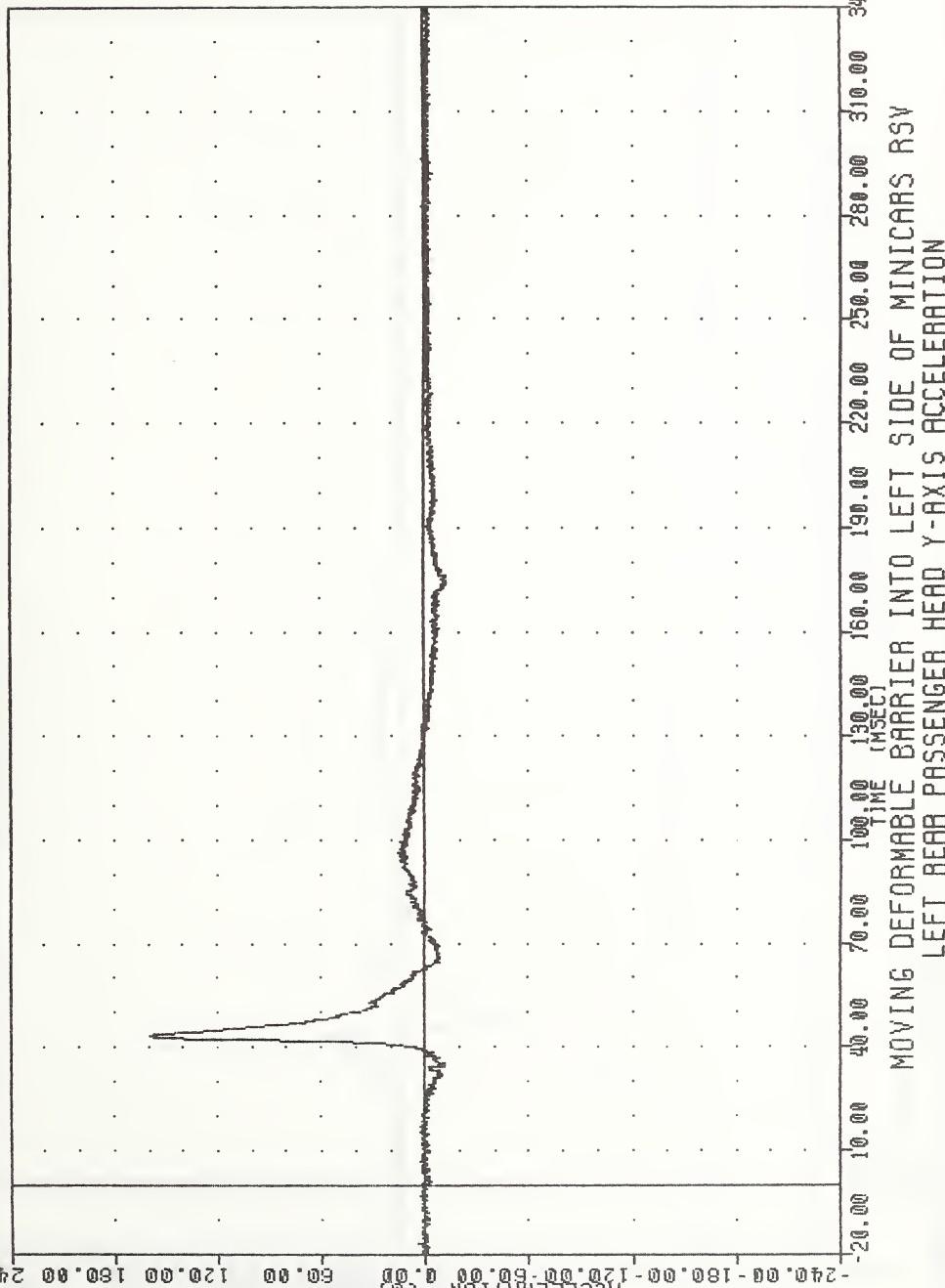
MIN, MAX VALUES = -21.88@ 46.38 @ 9.36 @ 32.75



VRTC
LEFT SIDE IMPACT
9114@
HEDY64

FILTER = ALLPF 1650/ 5214/ -40
MIN. MAX VALUES = -12.748 175.50 , 159.75 @ 43.25

-240.00 -180.00 -120.00 -60.00 0.00 60.00 120.00 180.00 240.00 ACCELERATION (G)

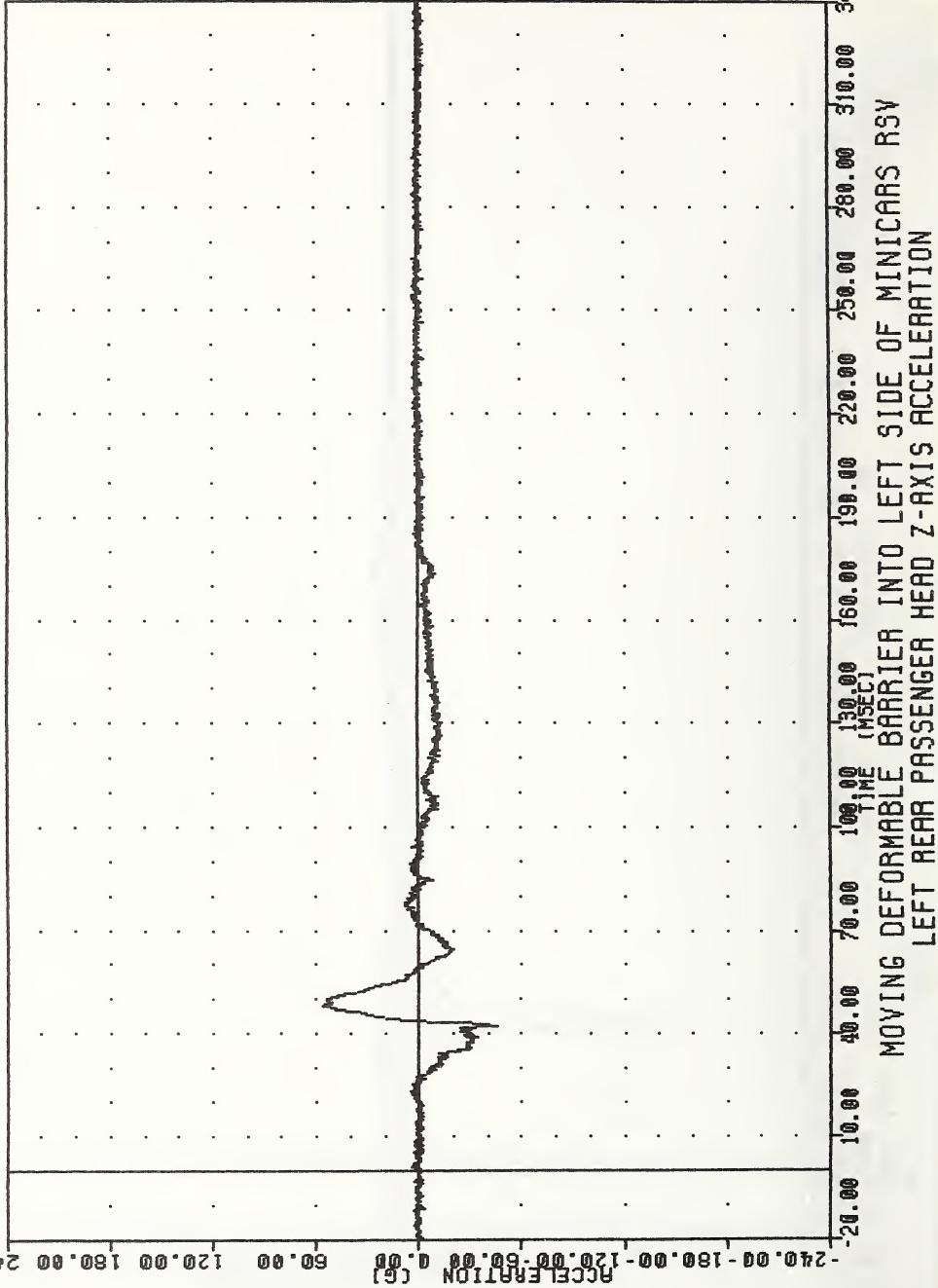


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER HEAD Y-AXIS ACCELERATION

YRTC 910520
LEFT SIDE IMPACT
9114@ HEDGCU

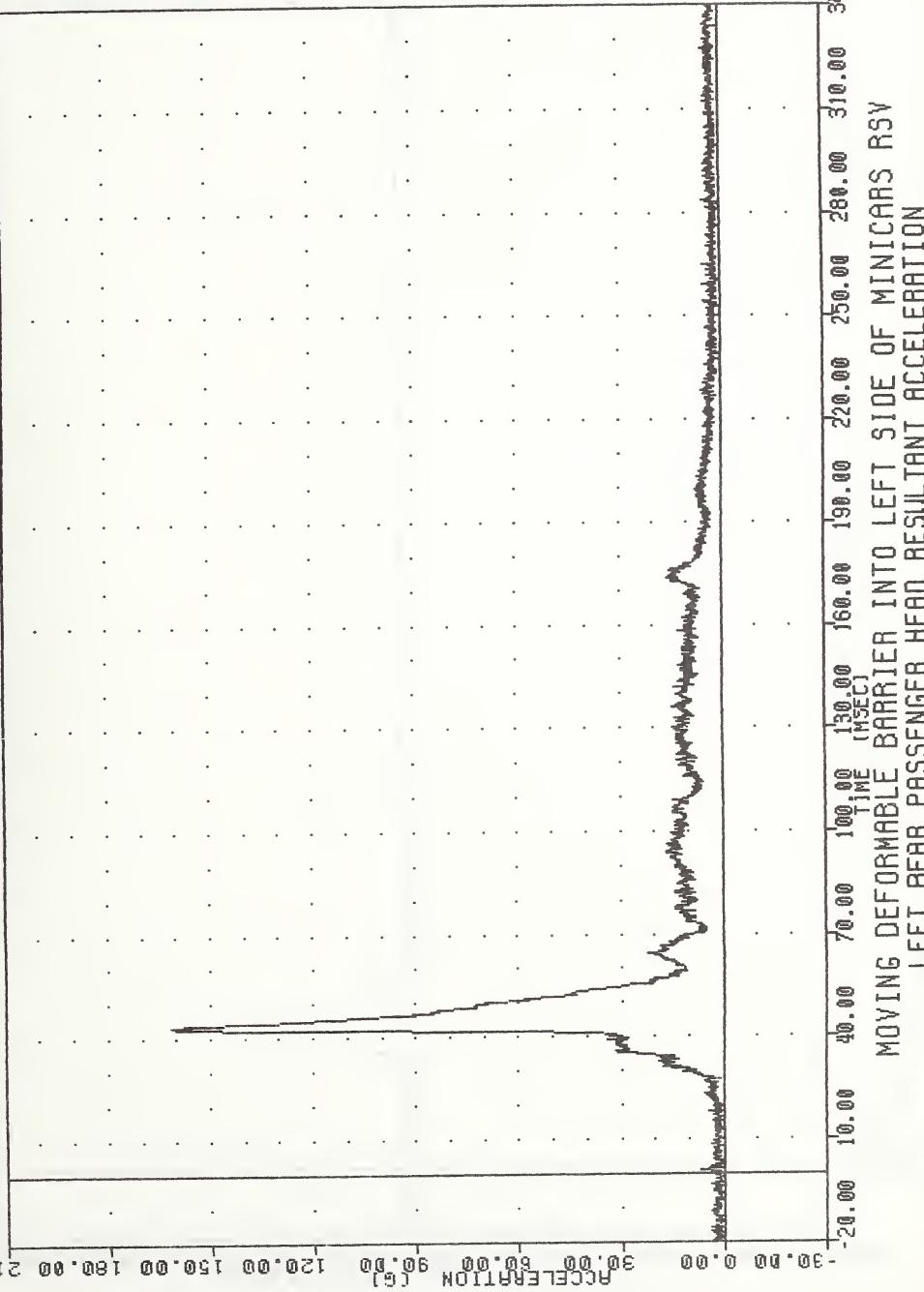
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -45.76@ 42.38 ,

56.72 @ 48.13



VFTC , 910520
LEFT SIDE IMPACT
9114@ HEDR64

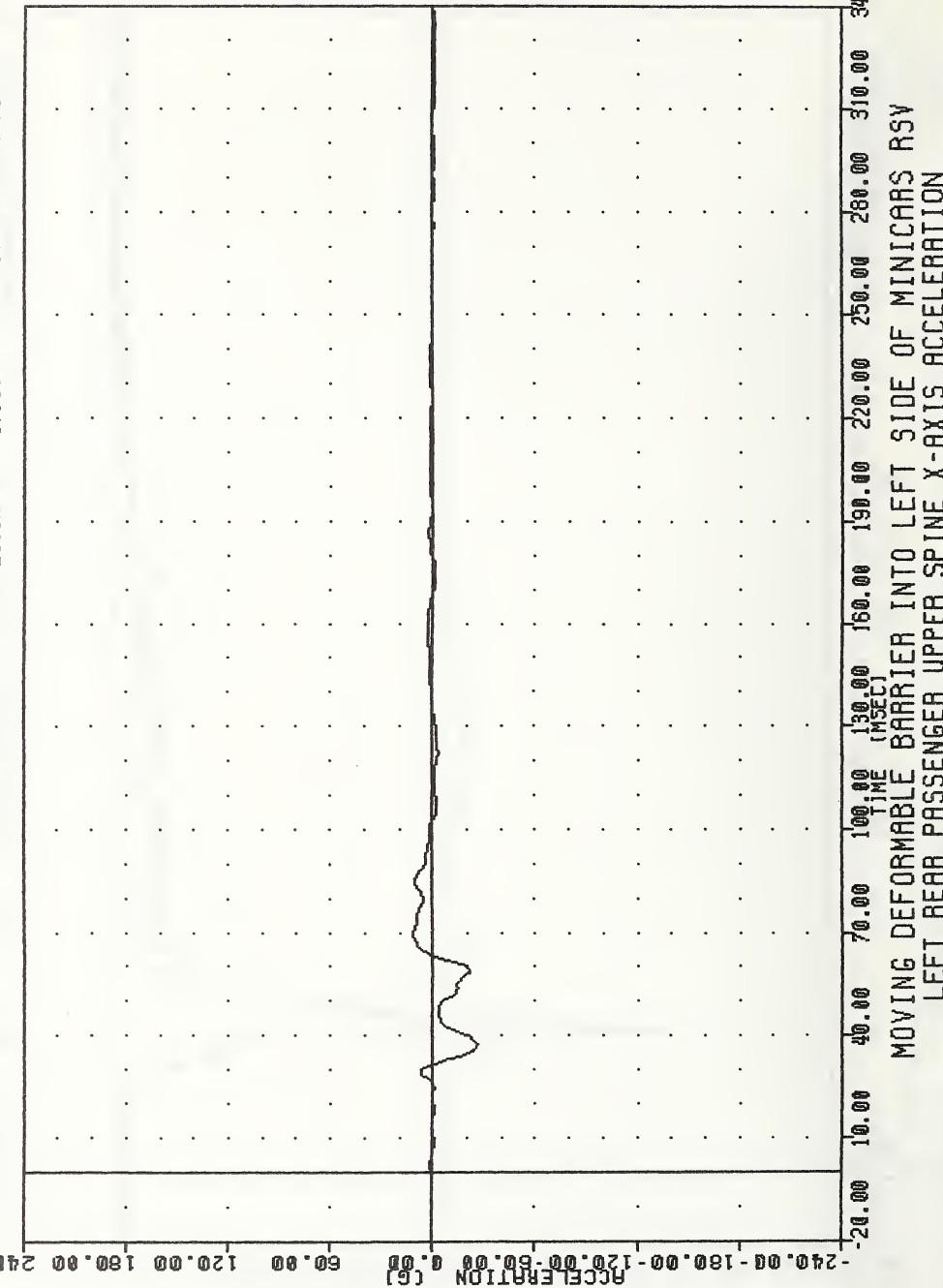
FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.15B 299.50 . 161.61 e 43.25



VRTC
LEFT SIDE IMPACT
91140
T01XG4

FILTER = HSRL 136/ 189/ -50
MIN, MAX VALUES = -25.82@ 37.50@
 11.39 @ 69.38

0.00

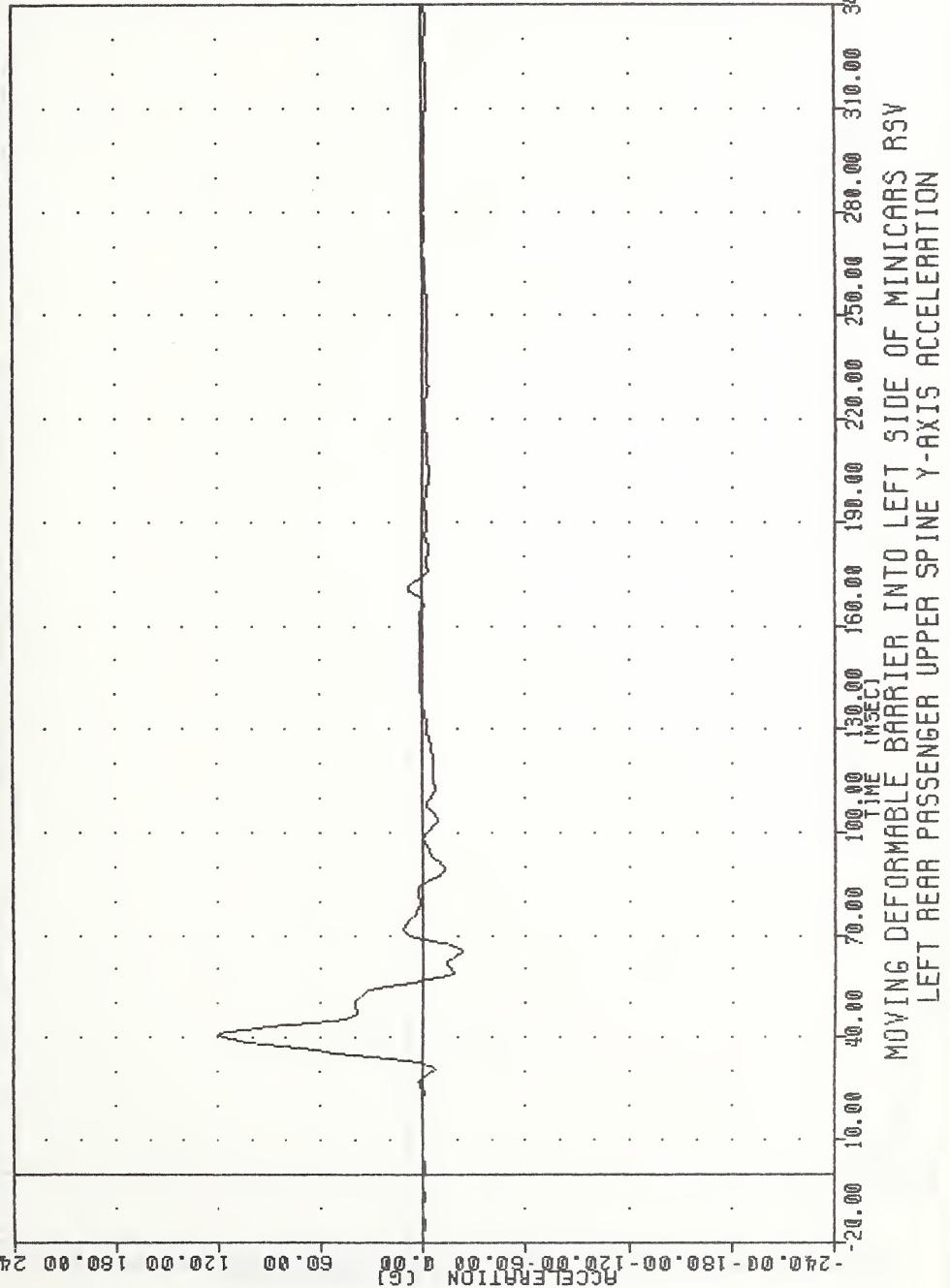


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER UPPER SPINE X-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
9114@
T01Y64

MIN. MAX VALUES = -22.63@ 65.00 . 120.38 @ 40.63

FILTER = HSR1 136/ 189/-50



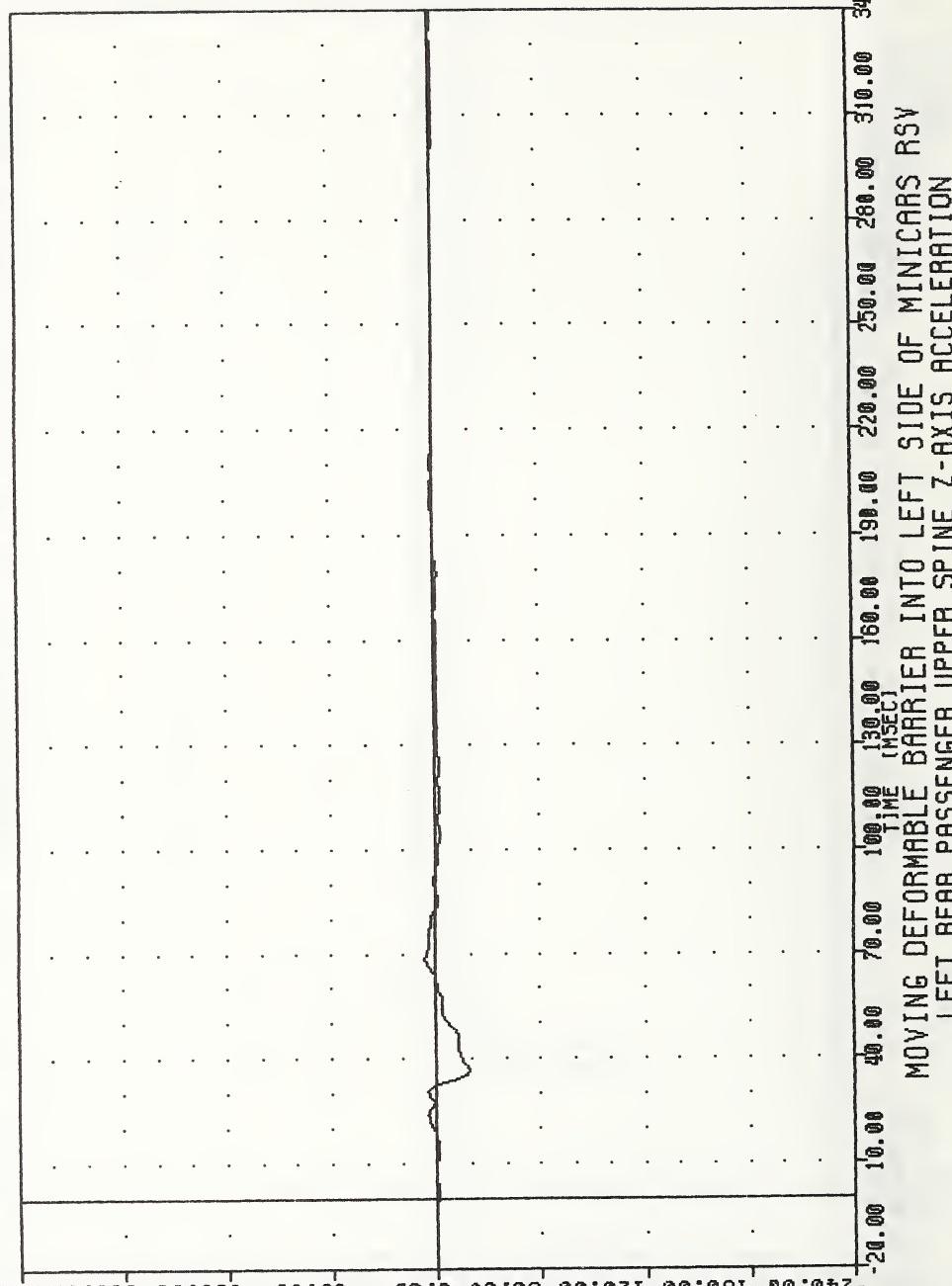
VRIC
LEFT SIDE IMPACT

9114@
701264

FILTER = HSRC
MIN. MAX VALUES = -18.668 36.88 , 6.22 & 68.75

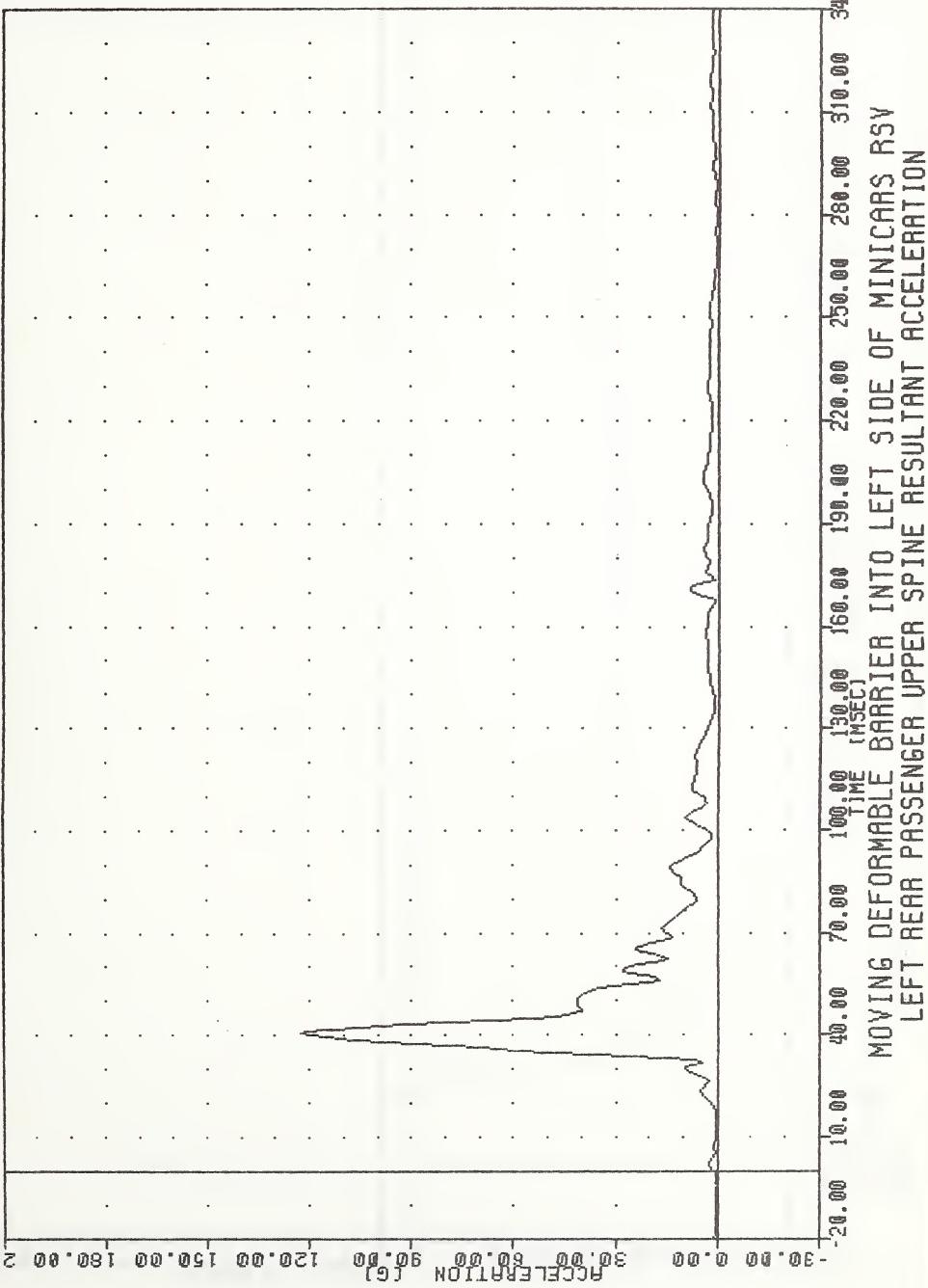
-240.00 -180.00 -120.00 -60.00 0.00 60.00 120.00 180.00 240.00

ACCELERATION (G)



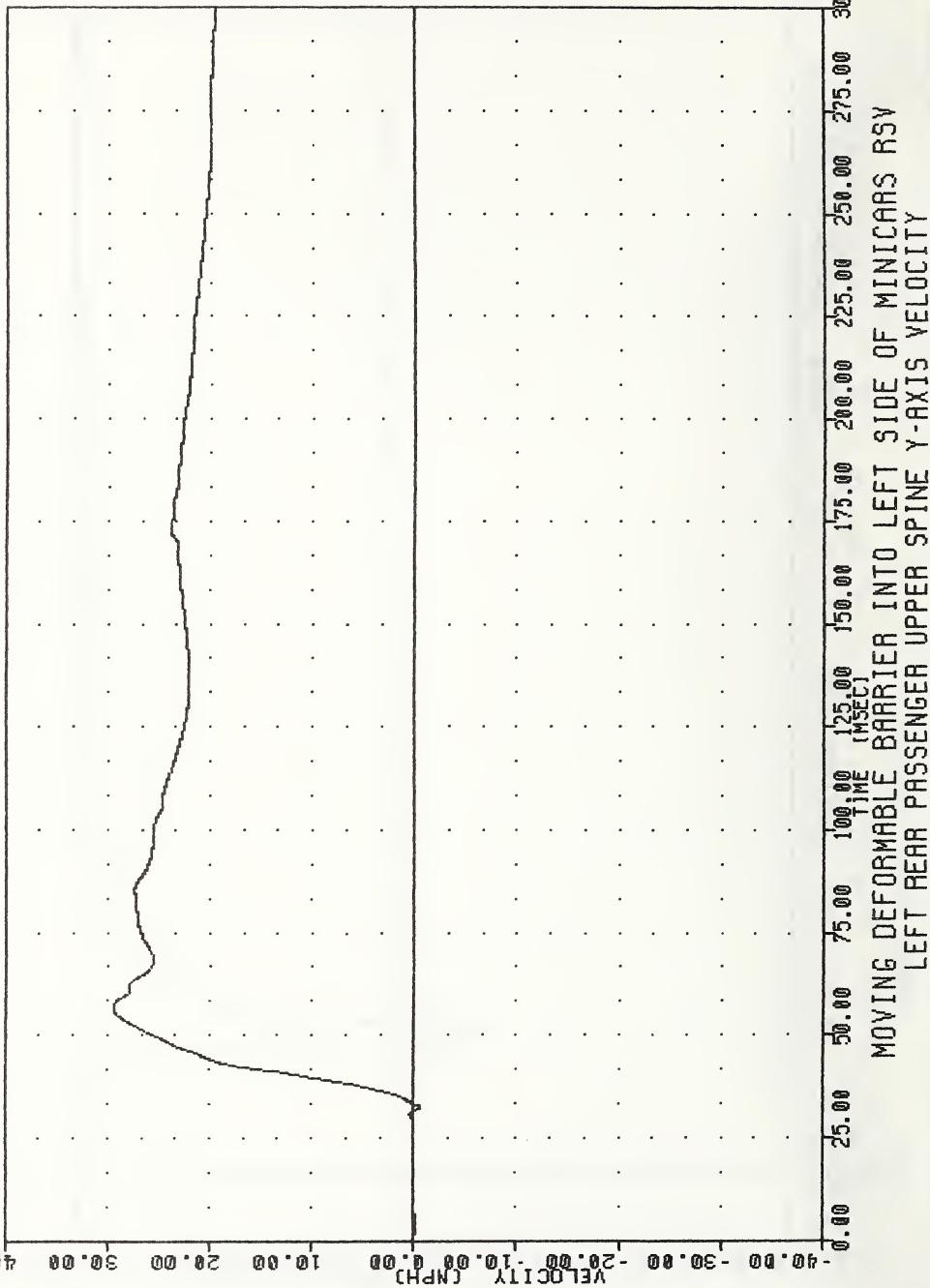
VRTC 910520
LEFT SIDE IMPACT
9114@ T01R64

FILTER = HSRI
MIN. MAX VALUES = 136/ 189/ -50
0.128 -4.38 , 122.33 @ 40.63



VRTC 910520
LEFT SIDE IMPACT
91140
101YY4

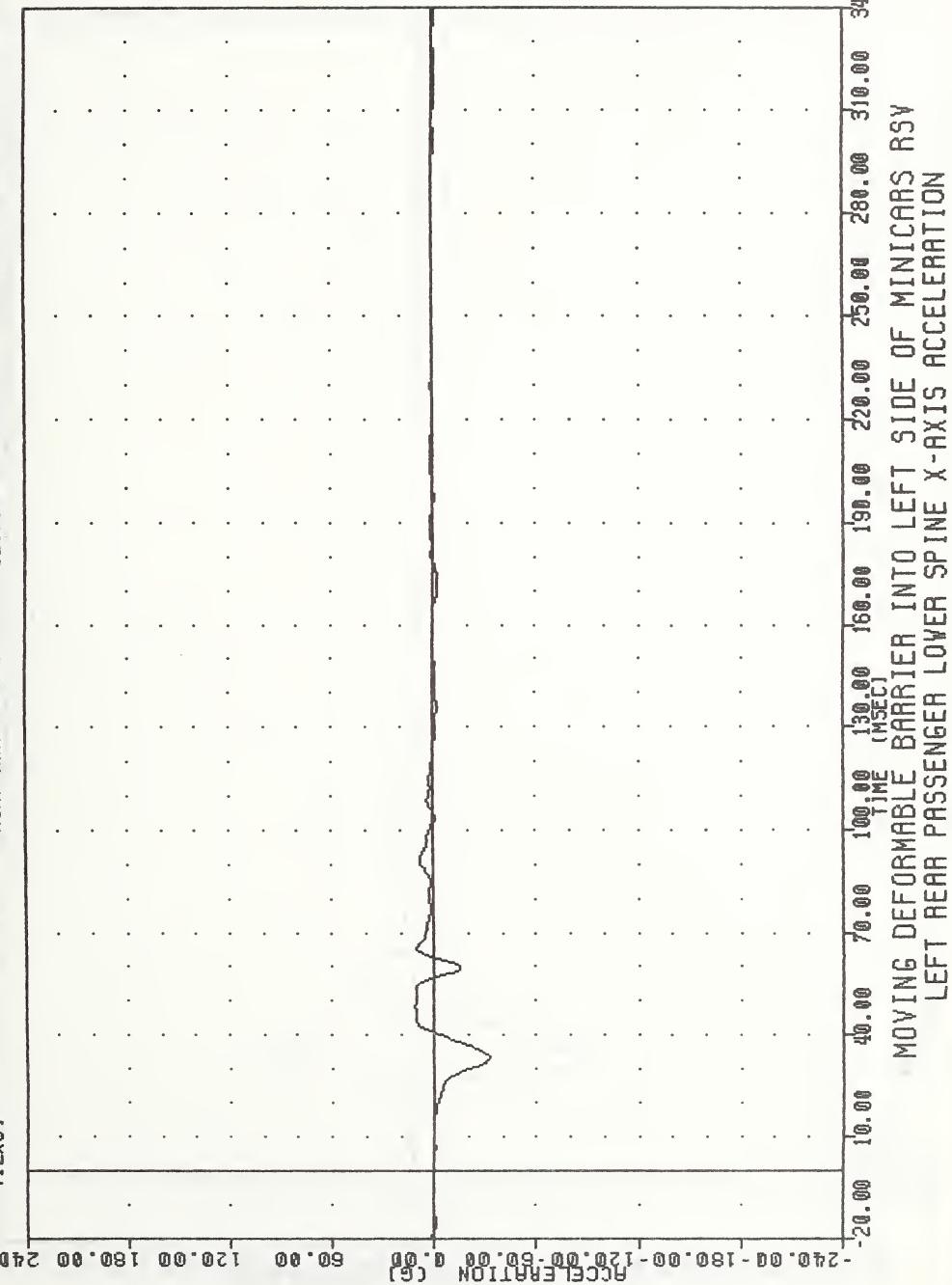
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.678 32.38 ,
29.38 & 56.75



VRTC , 910520
LEFT SIDE IMPACT
91140
T12XG4

MIN, MAX VALUES = -32.79 , 33.13 , 11.27 e 48.75

FILTER = HSRI 136/ 189/ -50



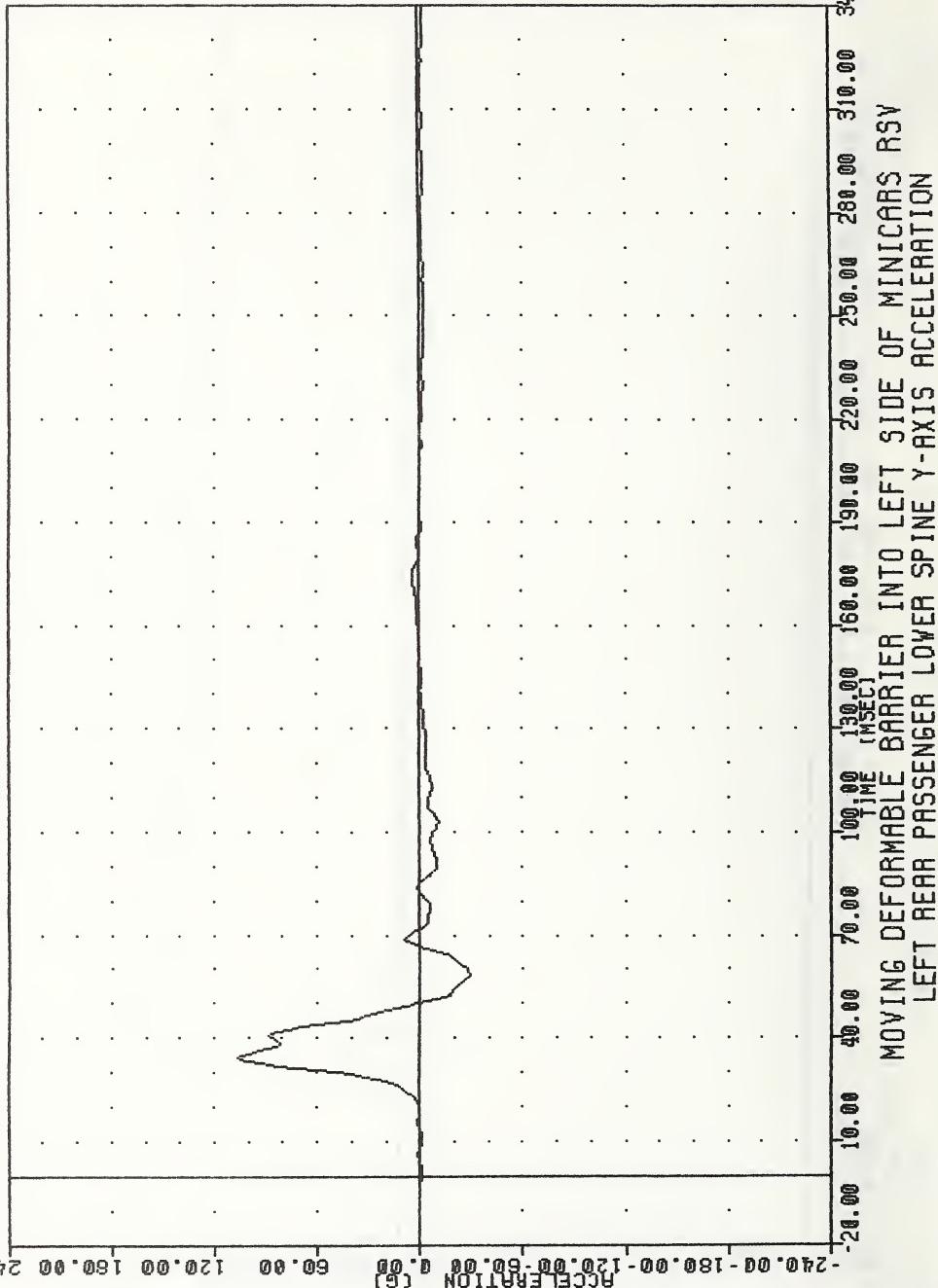
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LOWER SPINE X-AXIS ACCELERATION

VRTC 910520
LEFT SIDE IMPACT

9114@
T12Y64

FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -28.90@ 58.75 ,

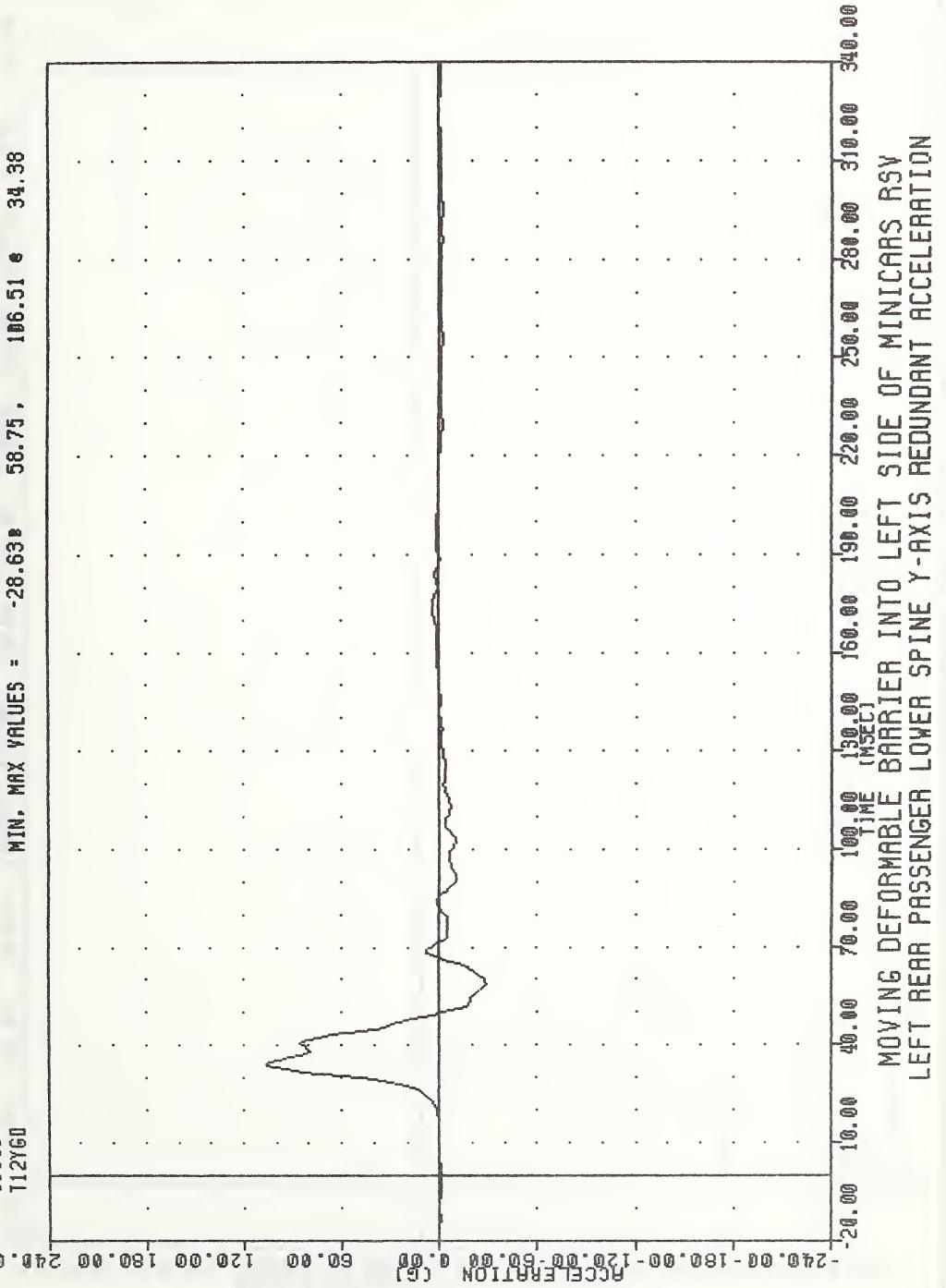
106.01 @ 34.38



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LOWER SPINE Y-AXIS ACCELERATION

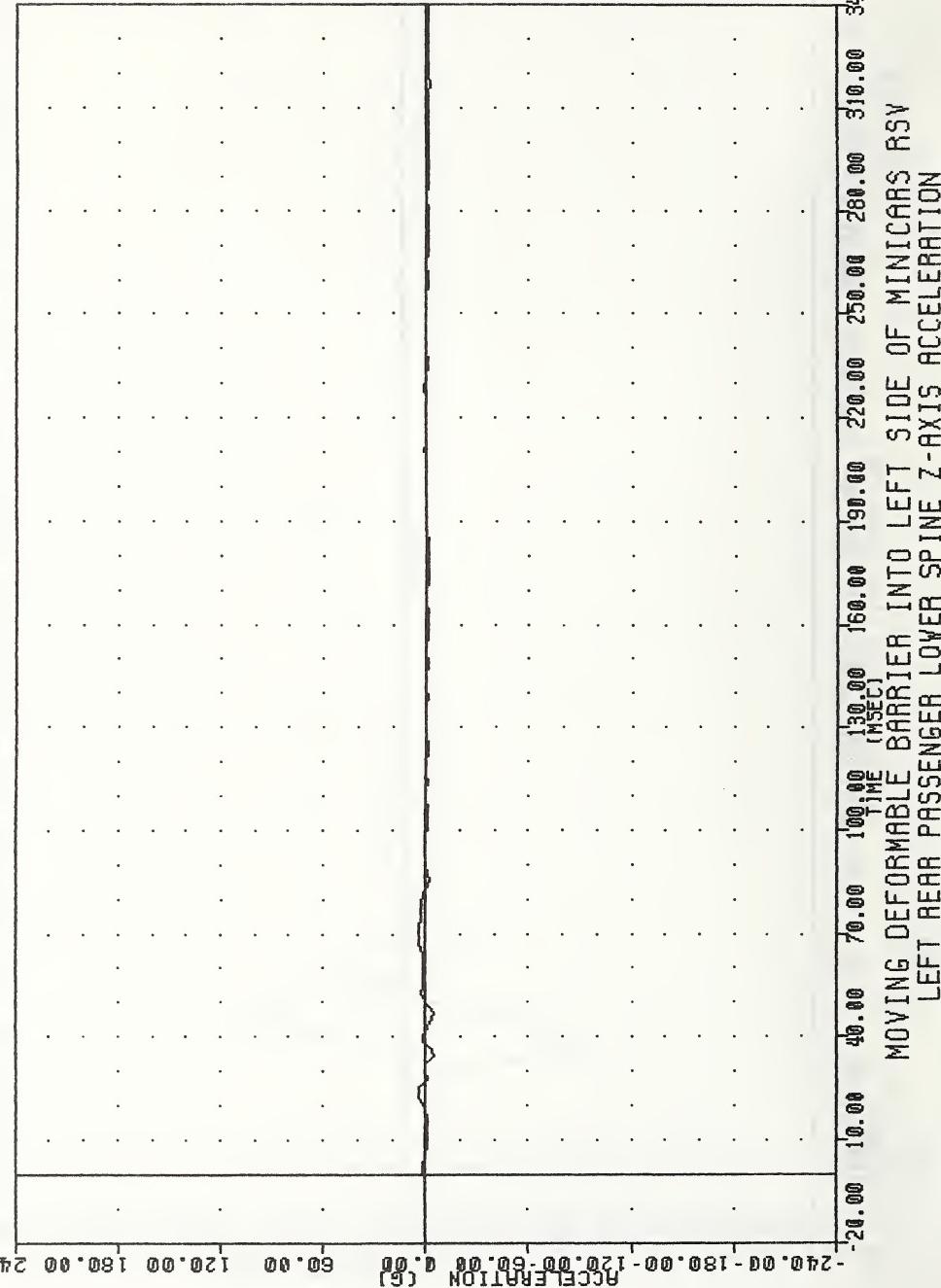
VRTC
LEFT SIDE IMPACT
9114@
112Y6U

MIN., MAX VALUES = -28.63@ 58.75 , 106.51 @ 34.38



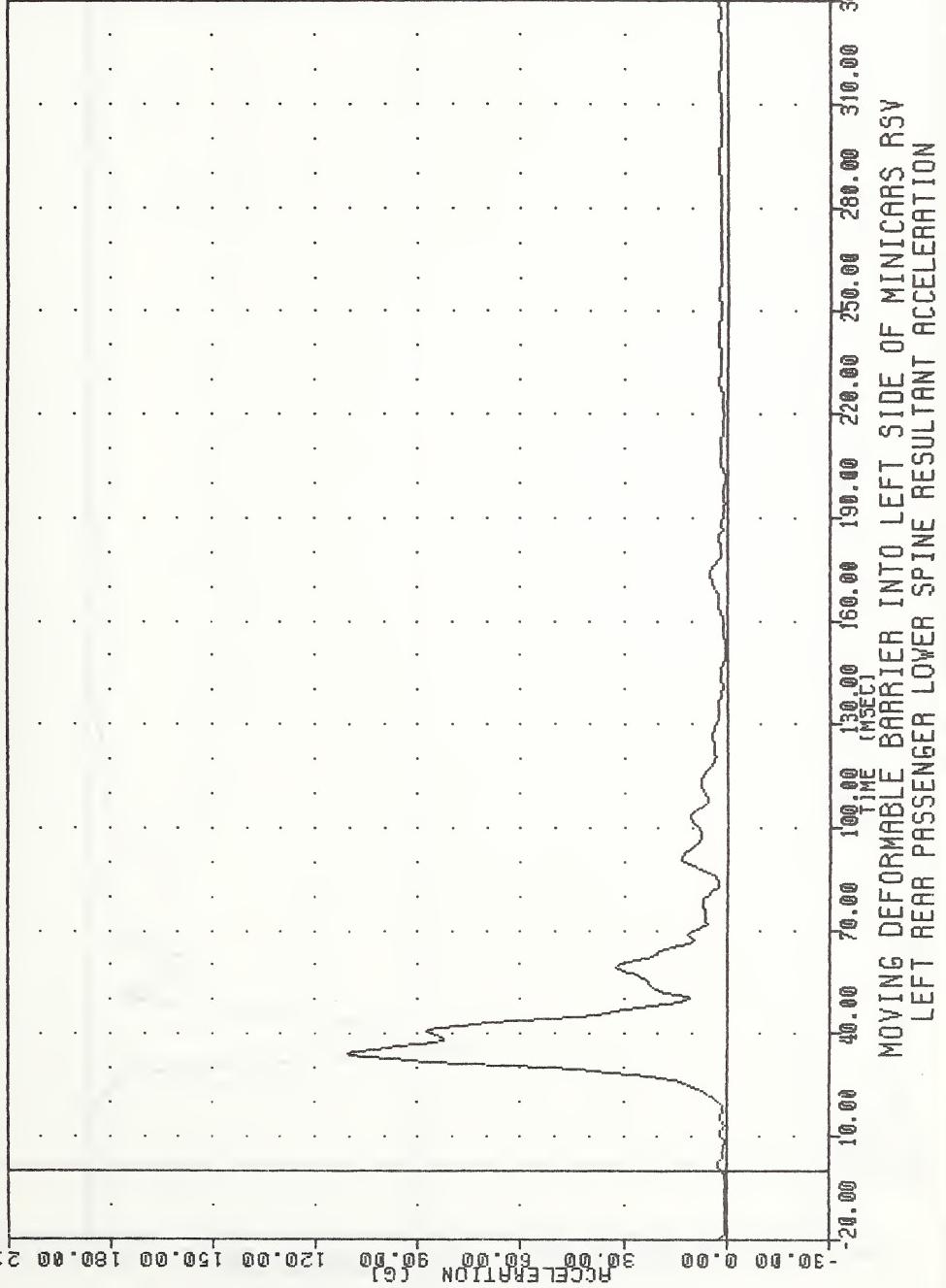
VRTC 910520
LEFT SIDE IMPACT
91140
T12264

FILTER = HSRI 136/ 189/-50
MIN. MAX VALUES = -4.57@ 35.00 , 4.57 @ 68.75



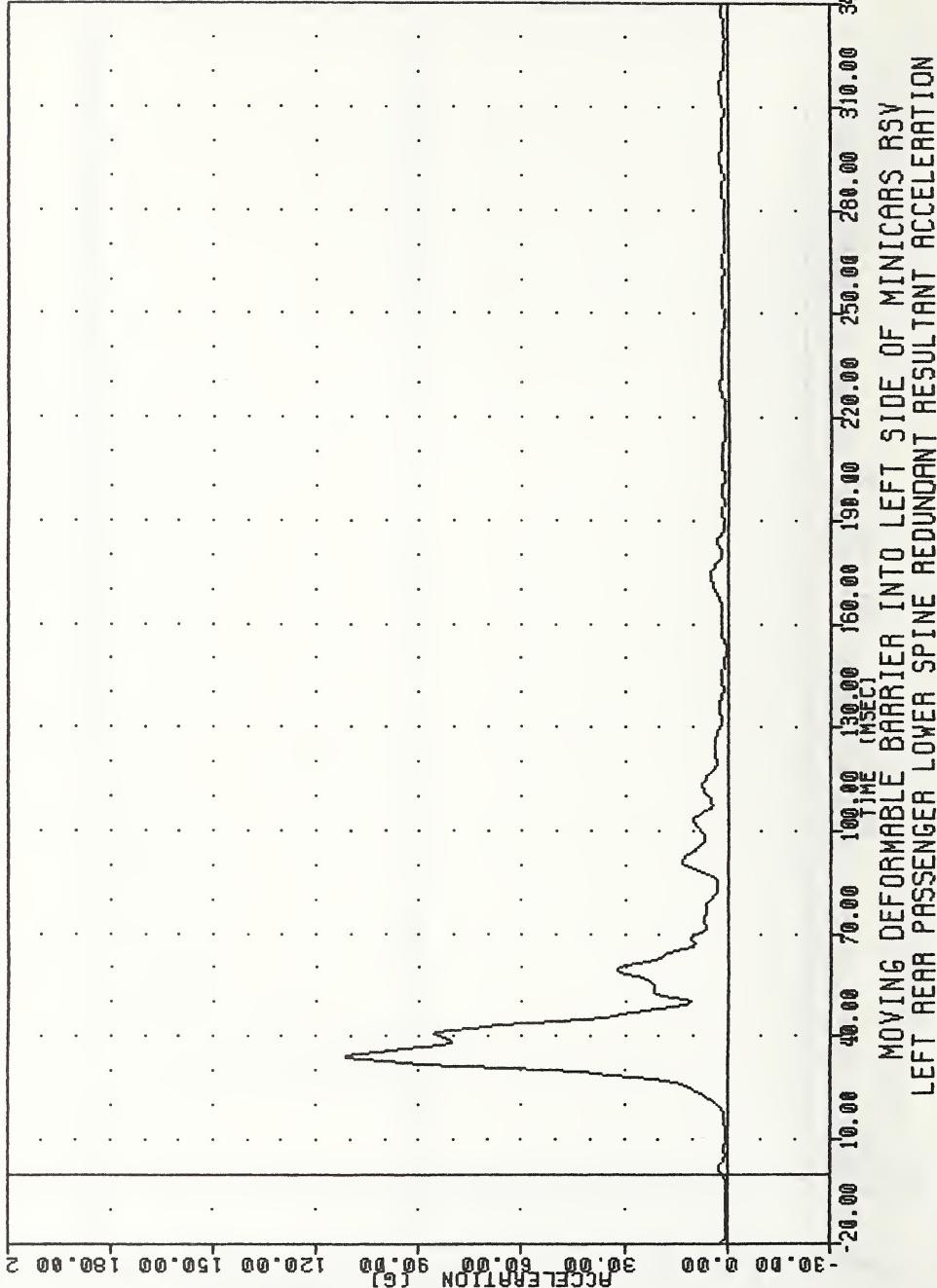
VRTC 910520
LEFT SIDE IMPACT
91140
112RG4

FILTER = HSRL
MIN, MAX VALUES = 0.176 -11.88 ,
110.49 e 34.38



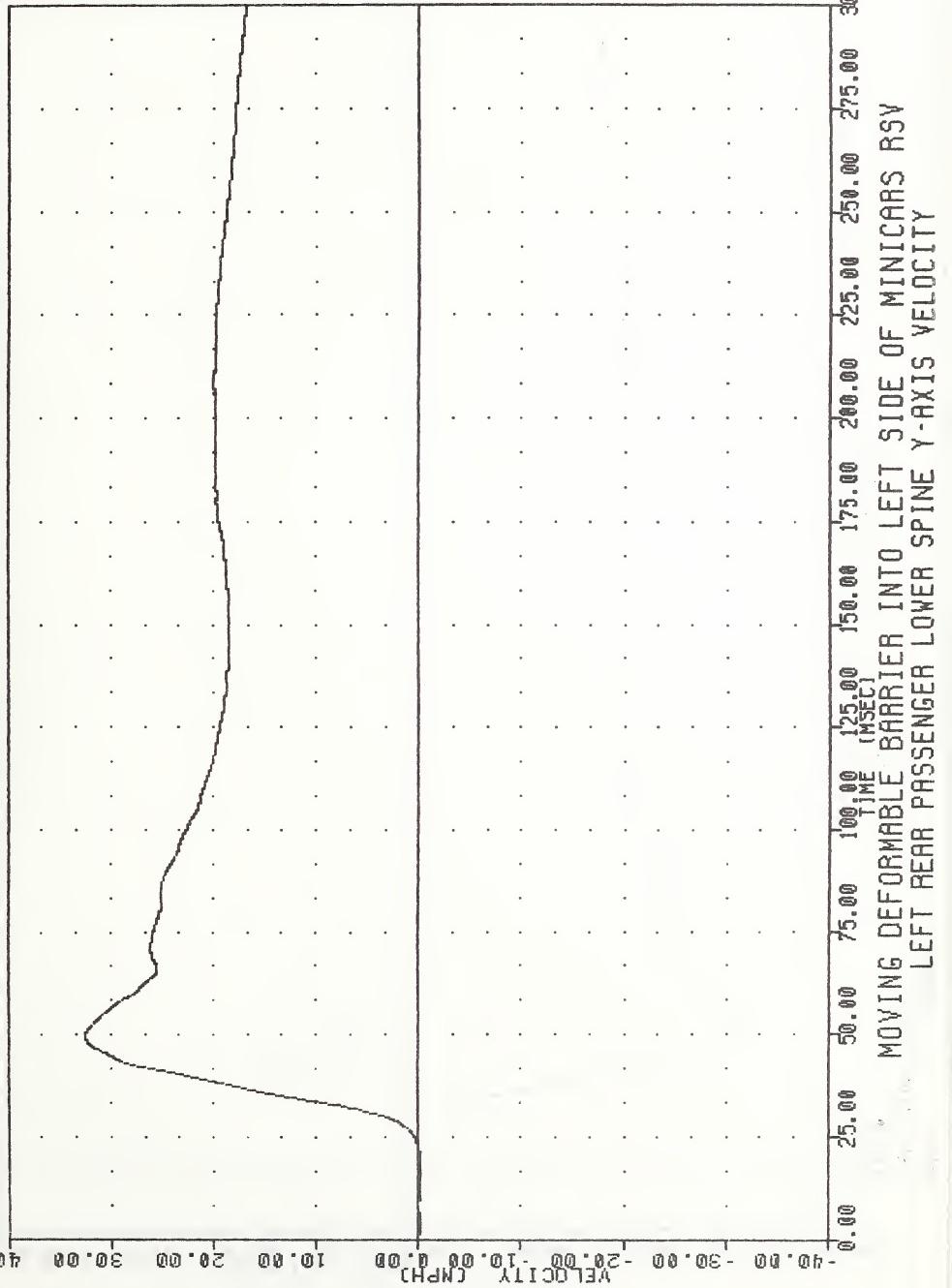
VRTC
LEFT SIDE IMPACT
9114@
T12R6D

910520
FILTER = HSRI 136/-50
MIN, MAX VALUES = 0.20@ -16.13 , 110.97 @ 33.75



WRTC
LEFT SIDE IMPACT
91140
T12Y4

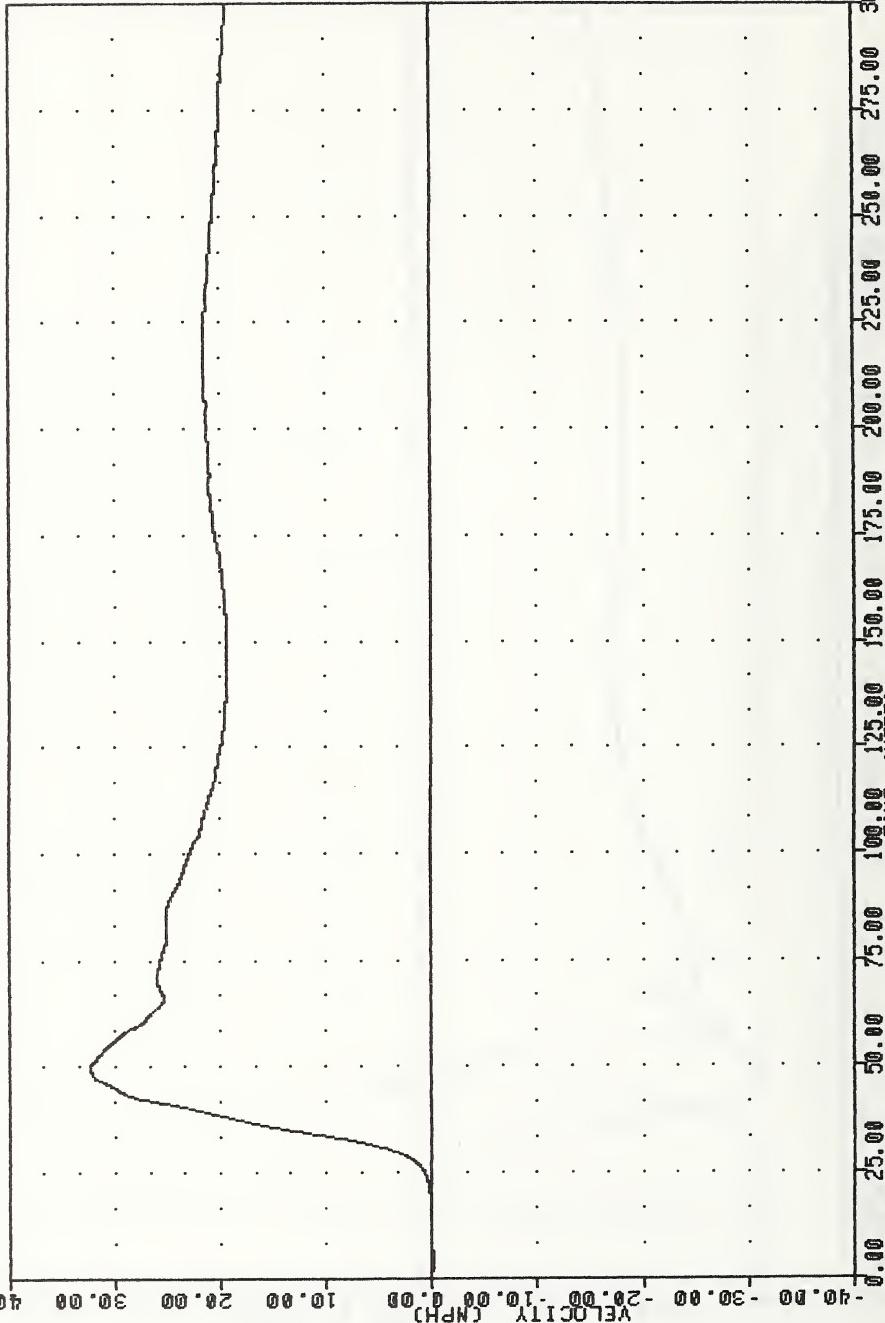
FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.15e - 11.75 , 32.58 e 49.88



VRTC
LEFT SIDE IMPACT
9114@
T12YV0

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.068 4.50 .

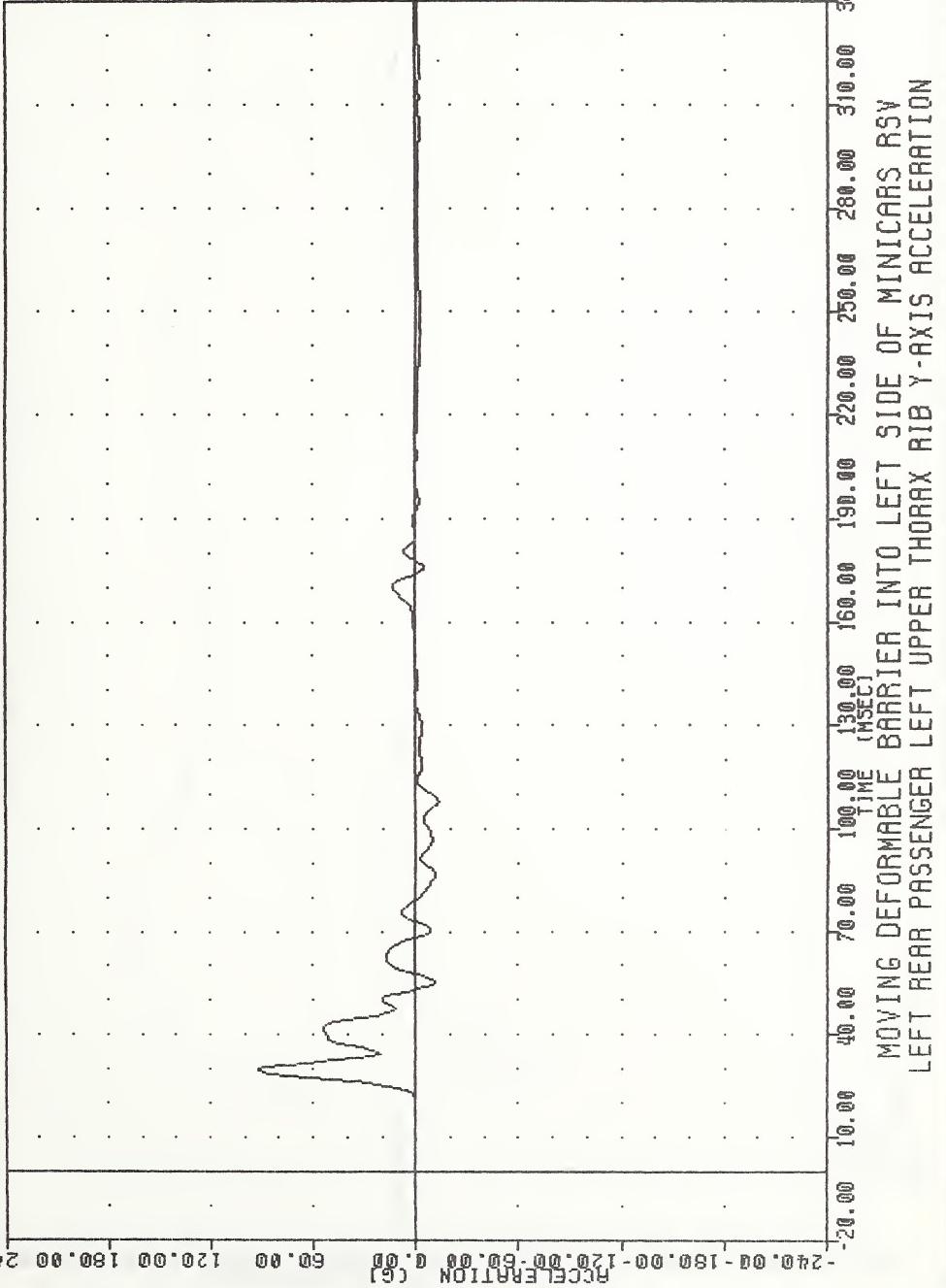
32.35 e 49.75



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LOWER SPINE Y-AXIS REDUNDANT VELOCITY

VRTC 910520
LEFT SIDE IMPACT
91140 LURK64

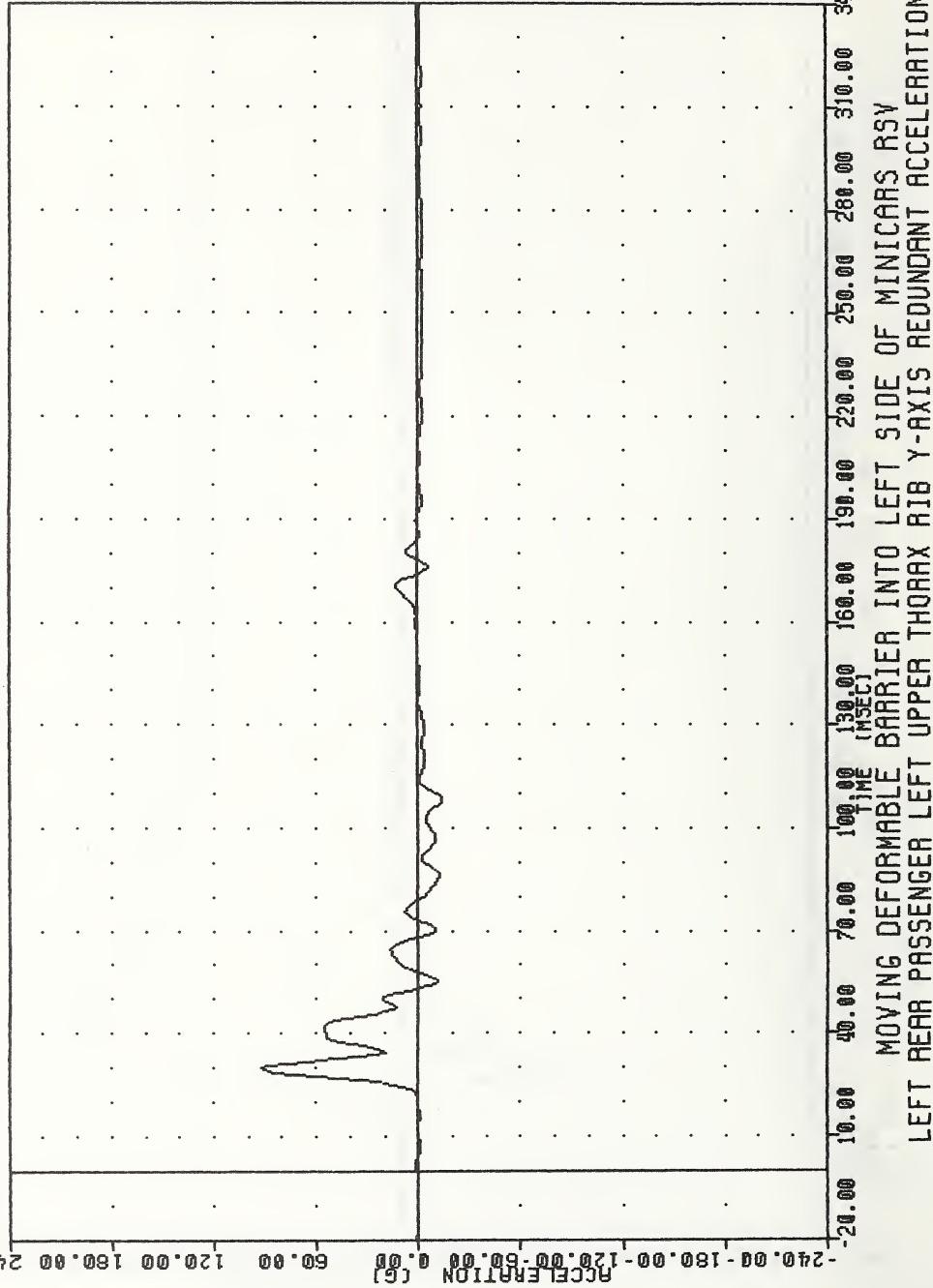
FILTER = HSRI 136/ 189/-50
MIN. MAX VALUES = -13.24@ 108.13 , 91.92 @ 30.00



VRTC
LEFT SIDE IMPACT
91140
LURG0

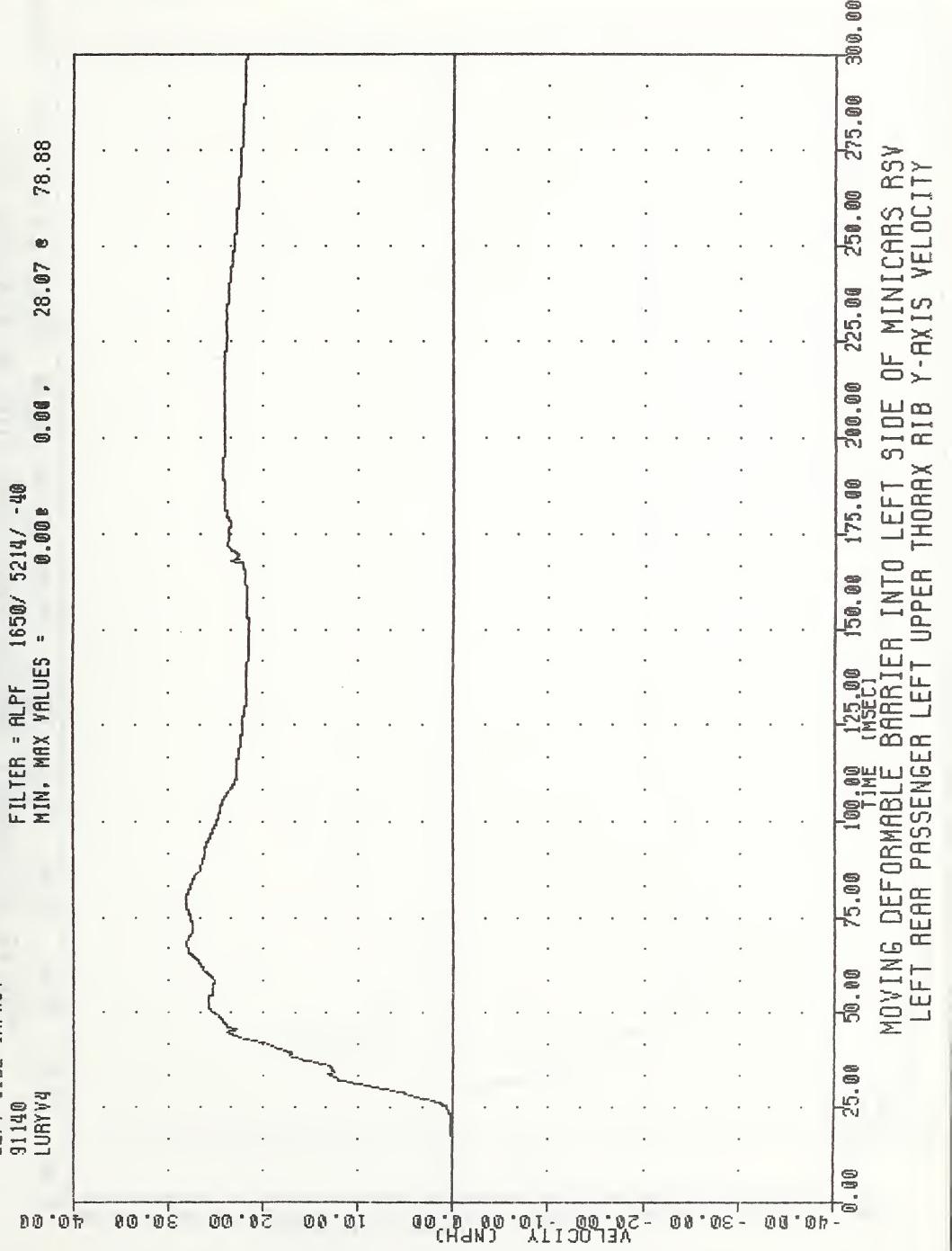
MIN. MAX VALUES = -13.70 e 108.13 ,
FILTER = HSRI 136/ 189/ -50

92.06 e 30.00



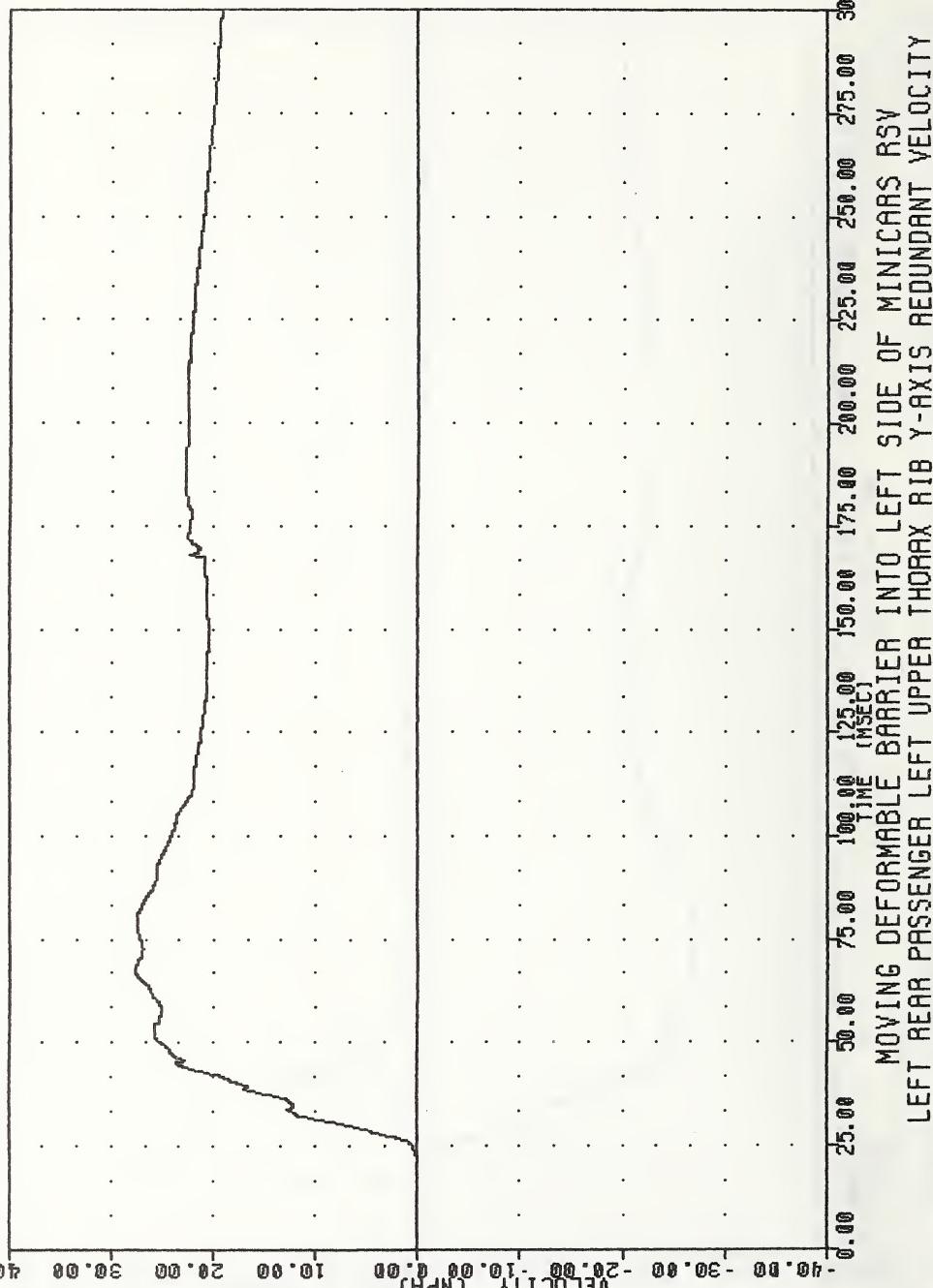
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LEFT UPPER THORAX RIB Y-AXIS REDUNDANT ACCELERATION

WRTG 910520
LEFT SIDE IMPACT
91140 LURYV4



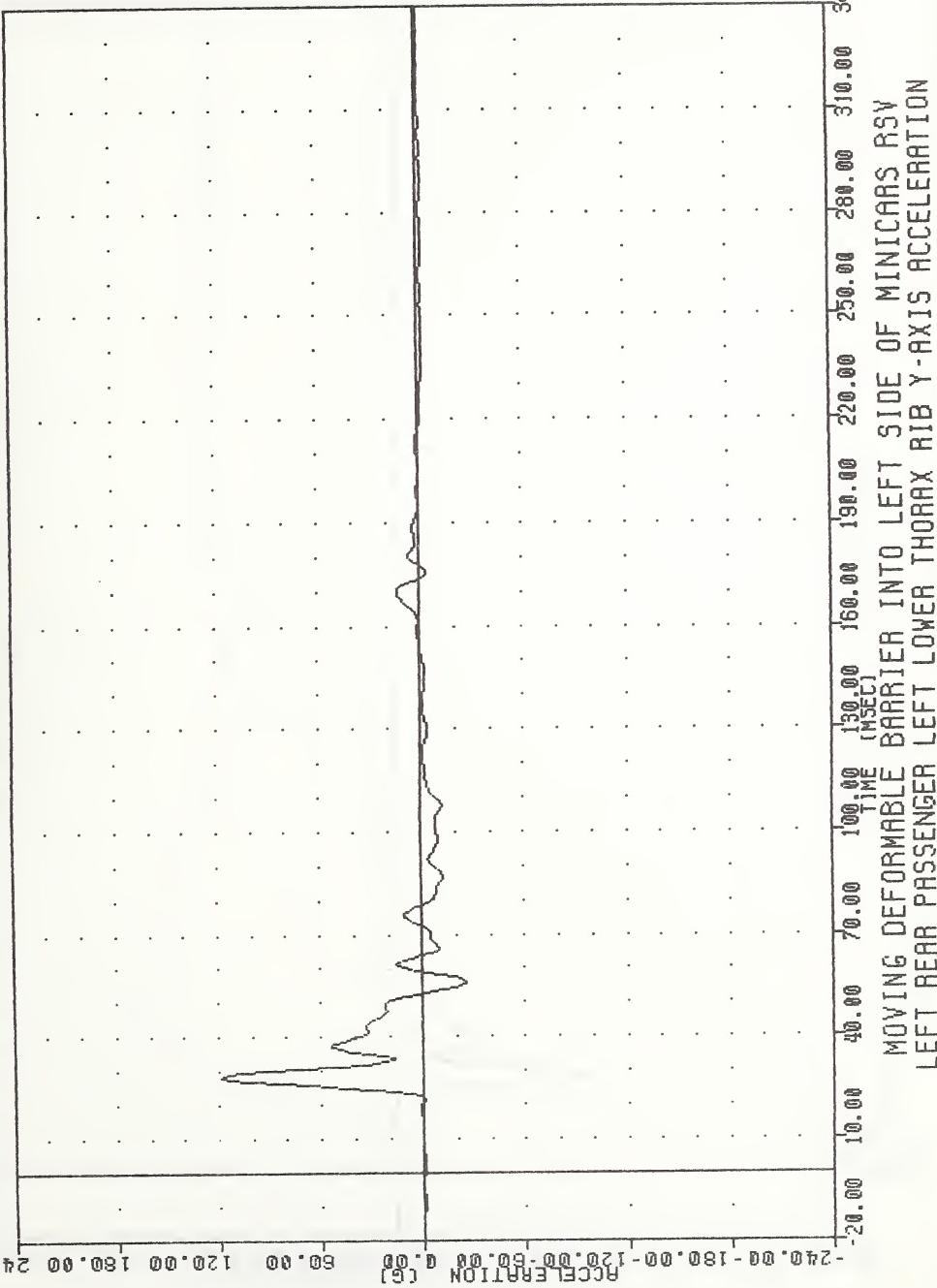
YRTC
LEFT SIDE IMPACT
91140
LURV40

FILTER = ALPF 1650/ 5214/-40
MIN, MAX VALUES = 0.000 0.25 ,
27.59 e 68.25



VRTC
LEFT SIDE IMPACT
9114@
LLRY64

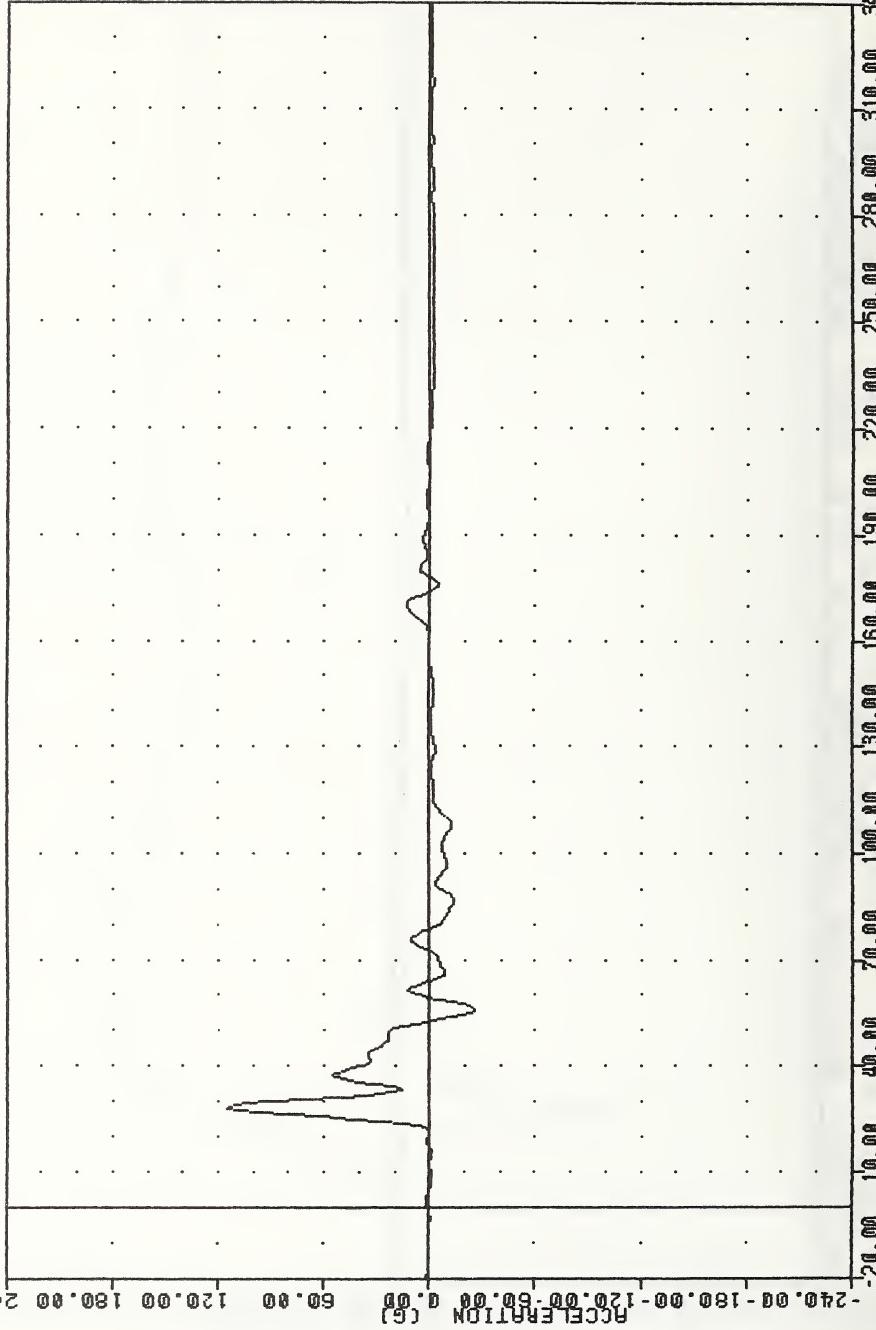
910520
FILTER = HSRI 136/ 189/ -50
MIN. MAX VALUES = -25.33@ 55.63 , 119.19 @ 28.13



VRTC
LEFT SIDE IMPACT
9114@
LLRYGD

MIN. MAX VALUES = -25.27@ 55.63 ,
FILTER = HSRL 136/ 189/ -50

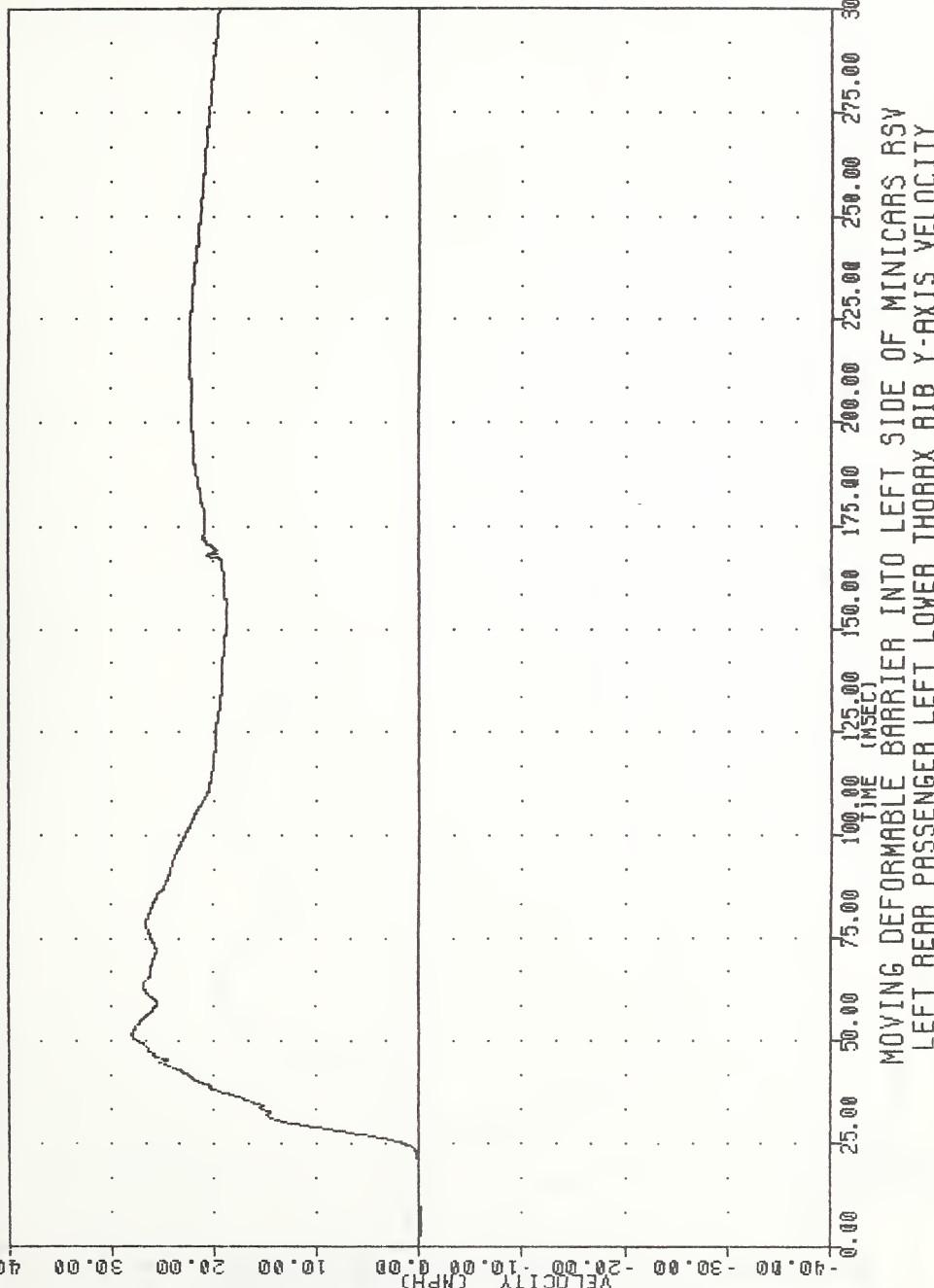
114.89 @ 26.13



-240.00 -180.00 -120.00 -60.00 0.00 60.00 120.00 180.00 240.00
ACCCELERATION (G's)
-20.00 10.00 40.00 70.00 100.00 130.00 160.00 190.00 220.00 250.00 280.00 310.00 340.00
TIME (MSEC)
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LEFT LOWER THORAX RIB Y-AXIS REDUNDANT ACCELERATION

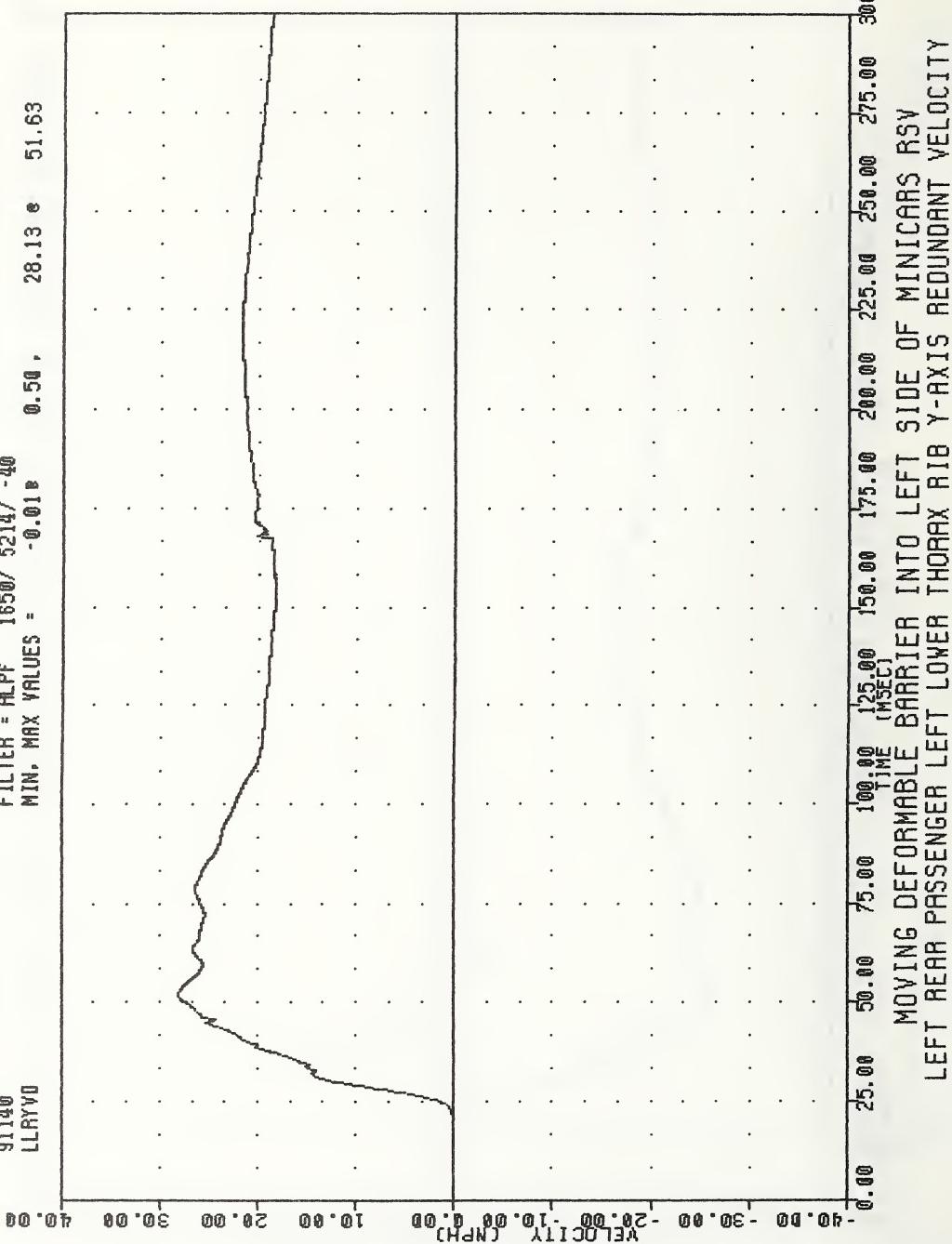
VRTC 910520
LEFT SIDE IMPACT
91140 LLRY44

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.108 5.38 , 28.05 e 51.63



YRTC
LEFT SIDE IMPACT
91140
LLRY0

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = -0.018 0.50 ,
28.13 e 51.63

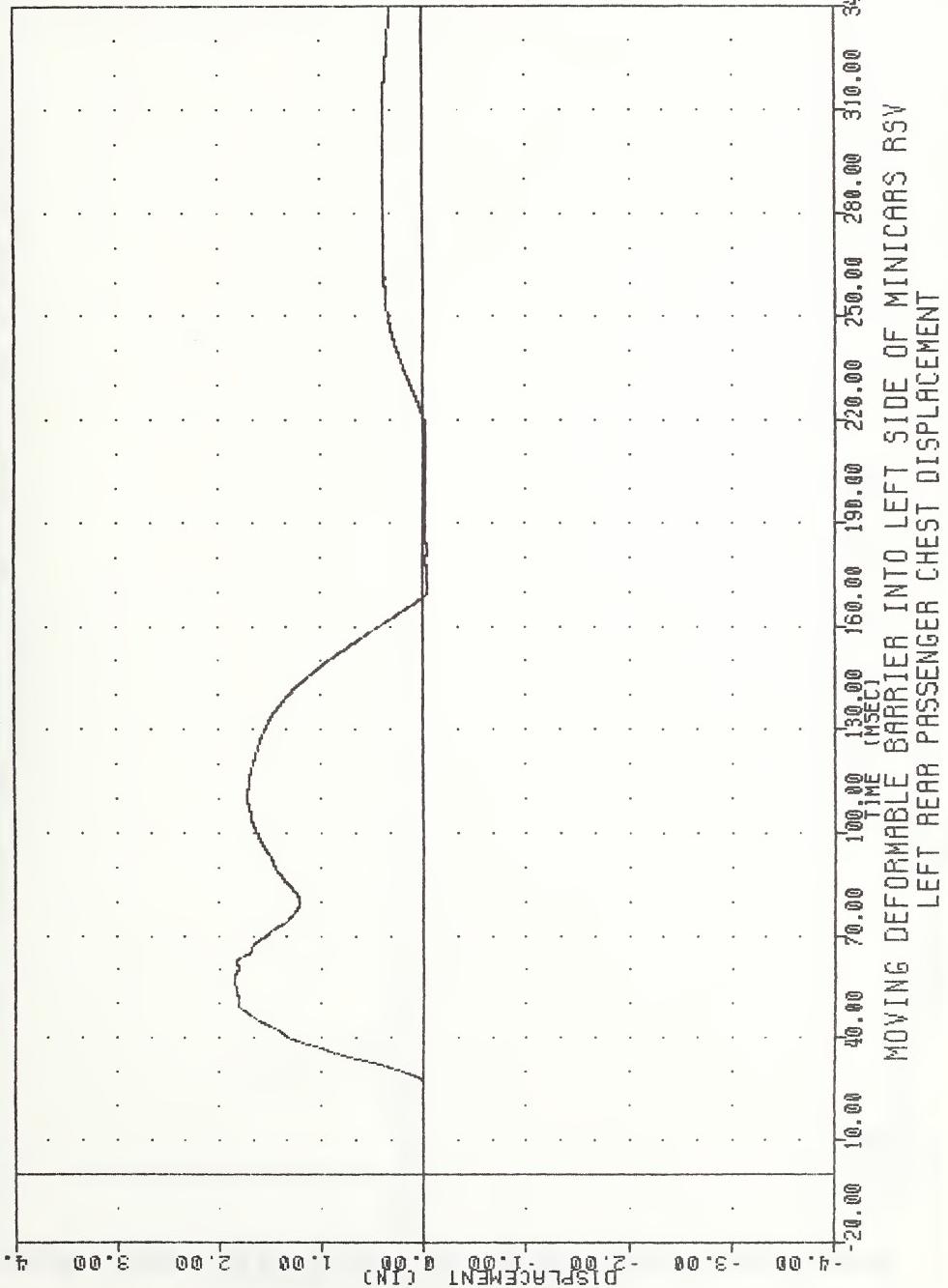


MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
LEFT REAR PASSENGER LEFT LOWER THORAX RIB Y-AXIS REDUNDANT VELOCITY

WRTC
LEFT SIDE IMPACT
91140

CSTYD4

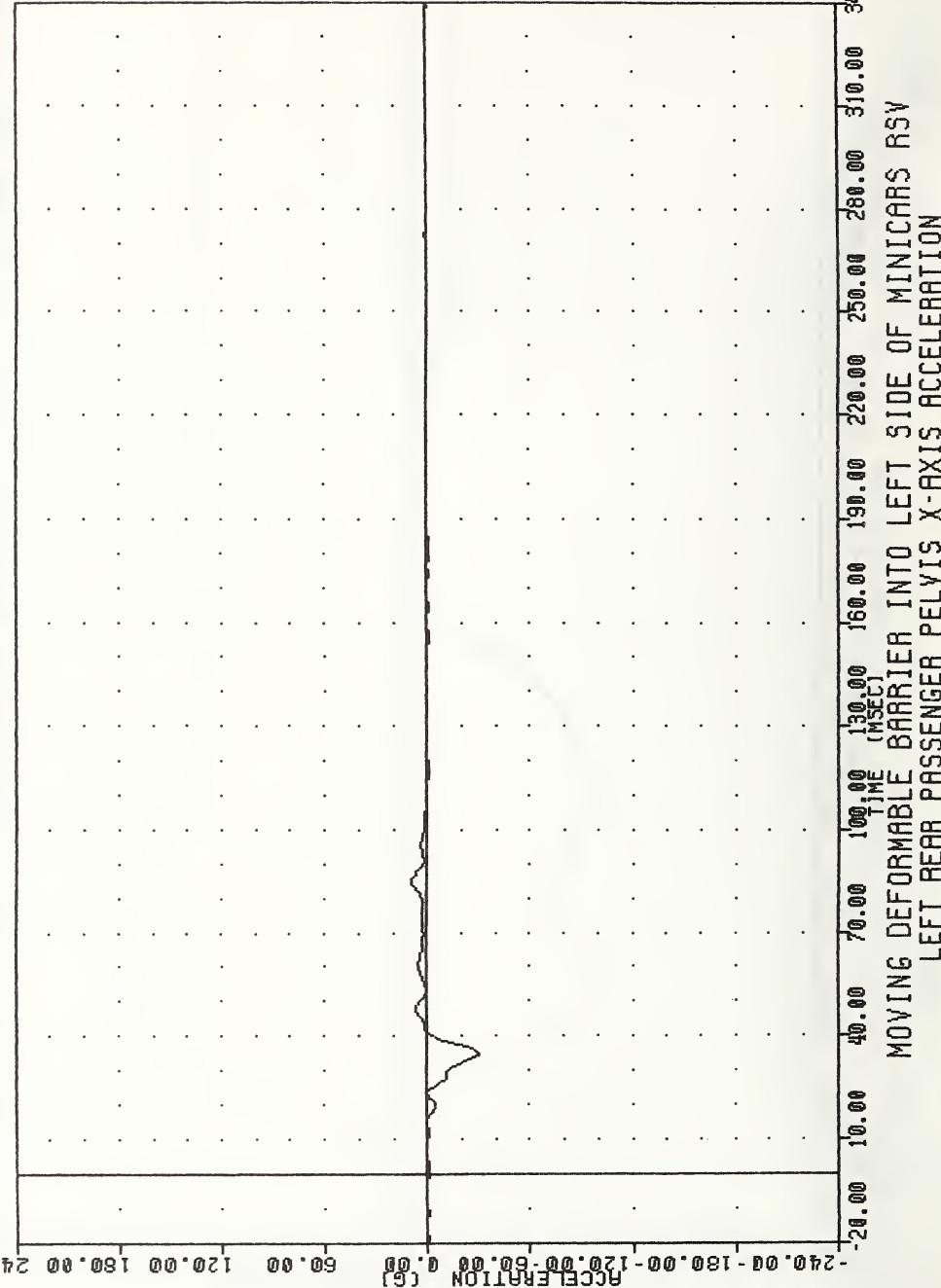
910520
FILTER = BLPF
MIN, MAX VALUES = -0.0448 170.00 ,
1.85 e 57.13



VRTC
LEFT SIDE IMPACT
9114@
PEVX64

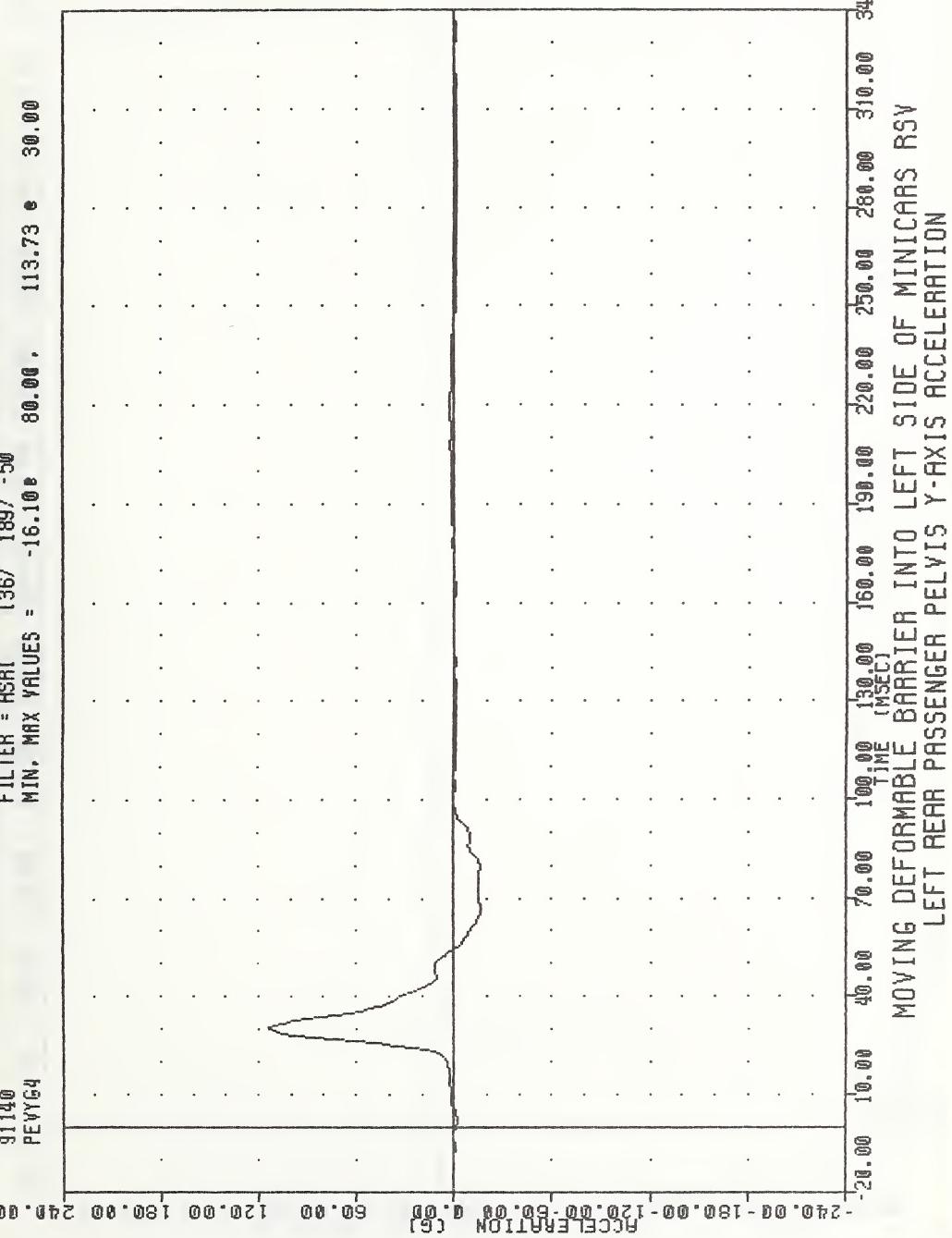
910520
FILTER = HSRI
MIN, MAX VALUES = -30.06@

136/ 189/ -50
35.04@
8.88 @ 85.00



VRTC
LEFT SIDE IMPACT
91140

PEYY64
910520
FILTER = HSRI
MIN, MAX VALUES = -16.100 80.00 ,
113.73 & 30.00

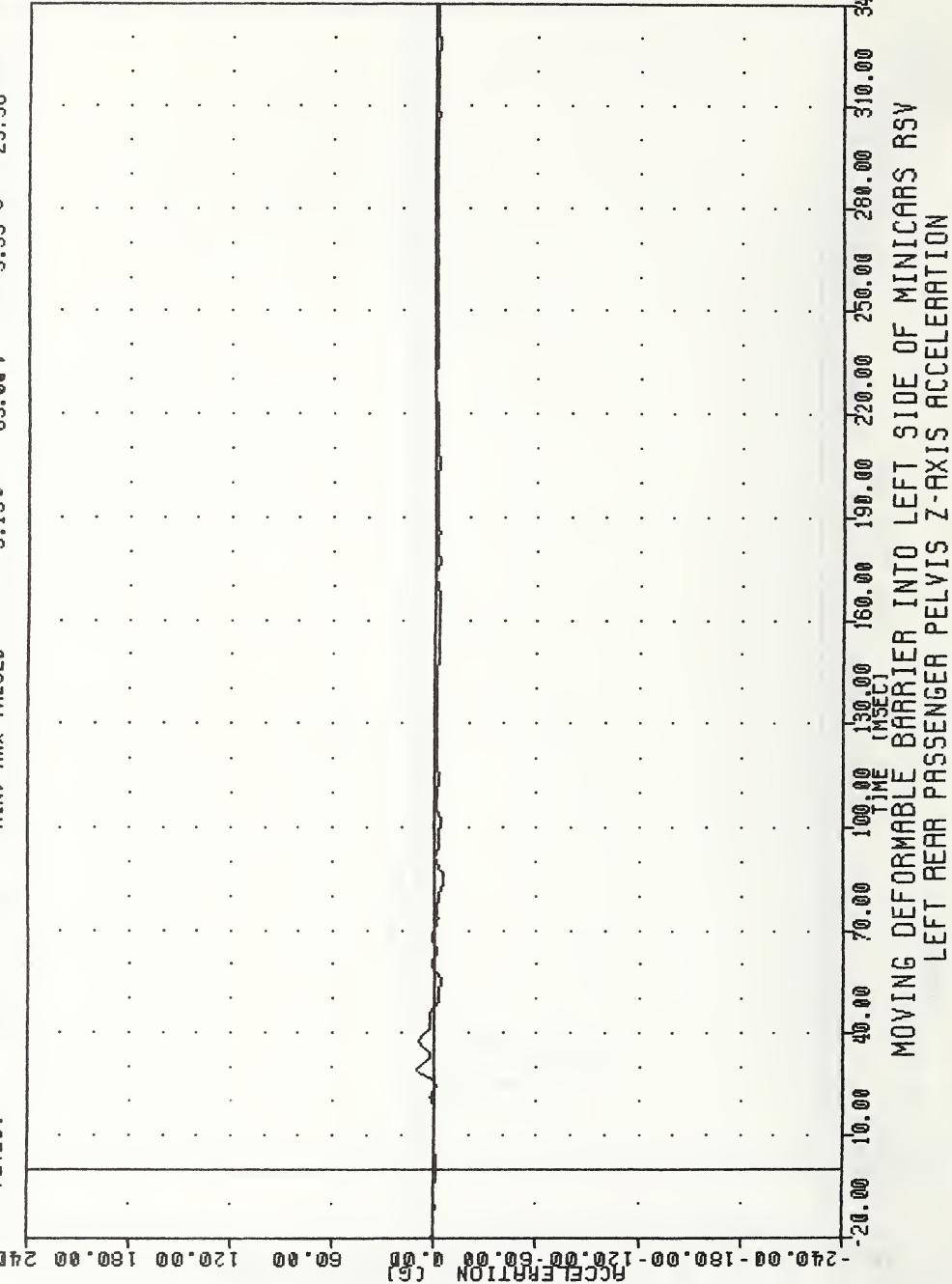


YRTC
LEFT SIDE IMPACT
9114@
PEYZG4

910520
FILTER = HSRI
MIN, MAX VALUES = -5.15@ 189/-5@
85.00 , 9.93 @ 29.38

PEYZG4

9.93

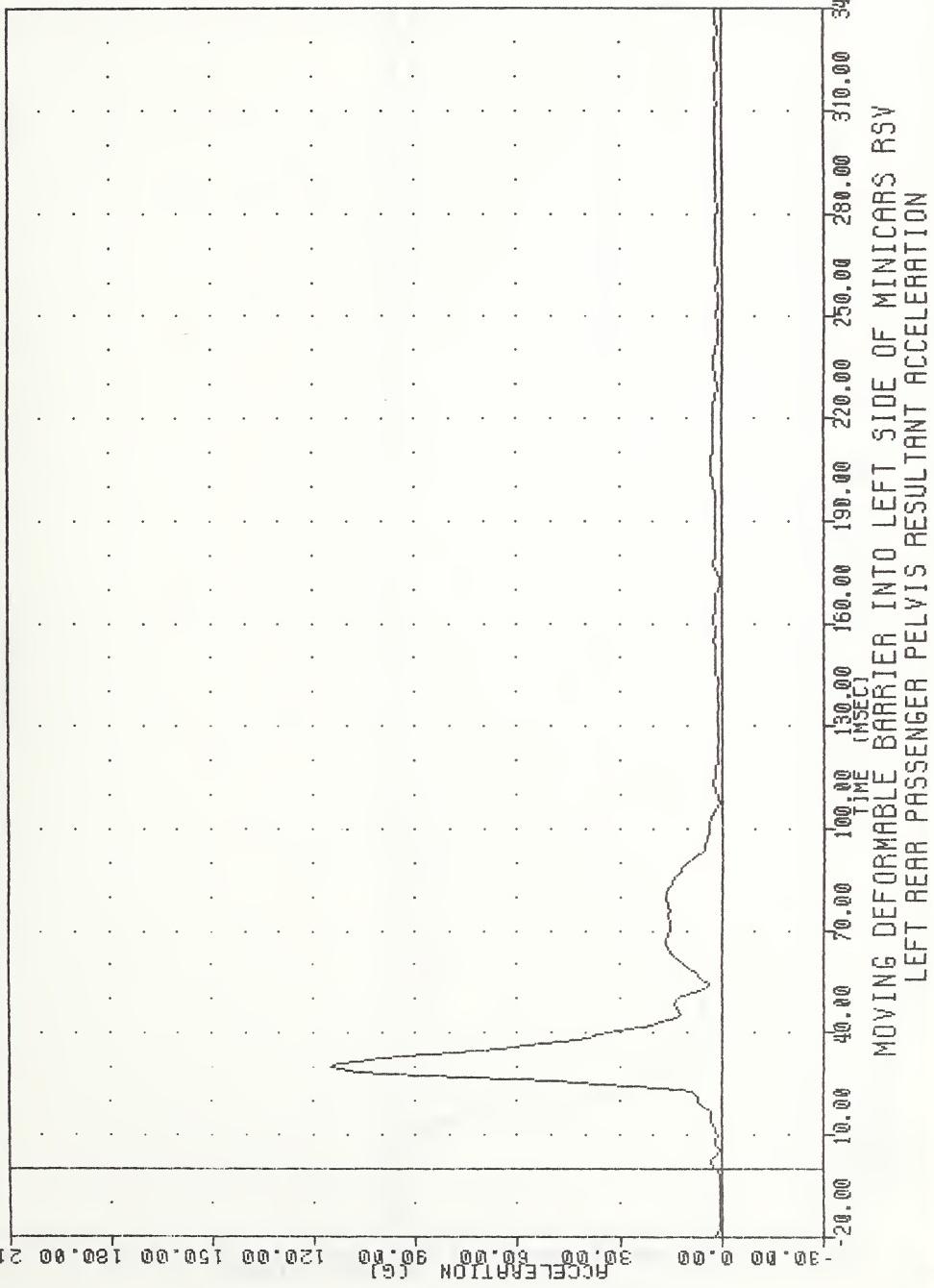


Moving deformable barrier into left side of minicars RSV
Left rear passenger pelvis z-axis acceleration

WRTC , 910526
LEFT SIDE IMPACT

9114@
PEVRG4

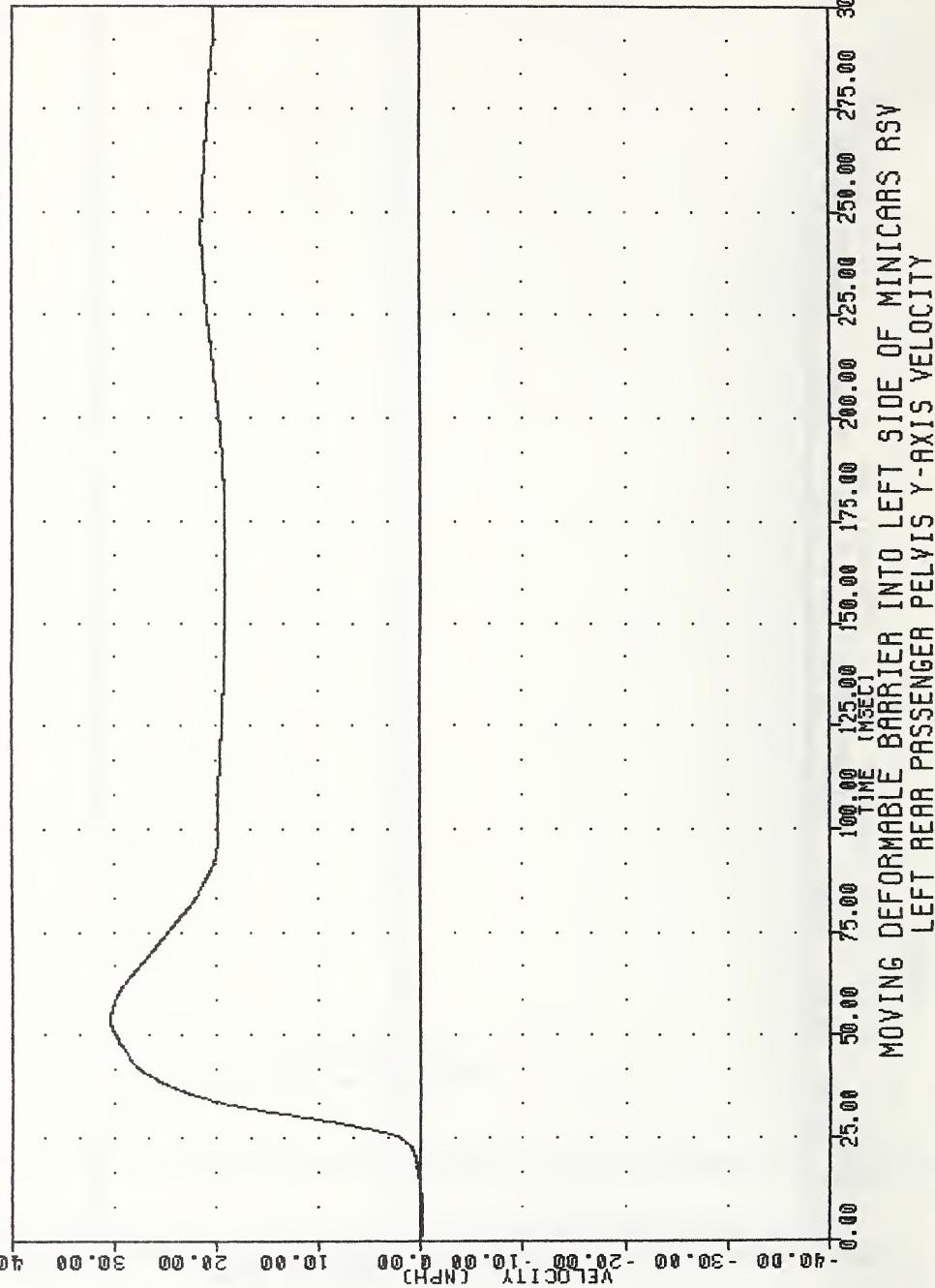
FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = 0.14@ -16.87 , 114.77 @ 30.00



YRTC 910520
LEFT SIDE IMPACT
91140 PEVVY

FILTER = FLPPF 1650/ 5214/ -40
MIN, MAX VALUES = -0.228 4.63 ,

30.39 & 53.75

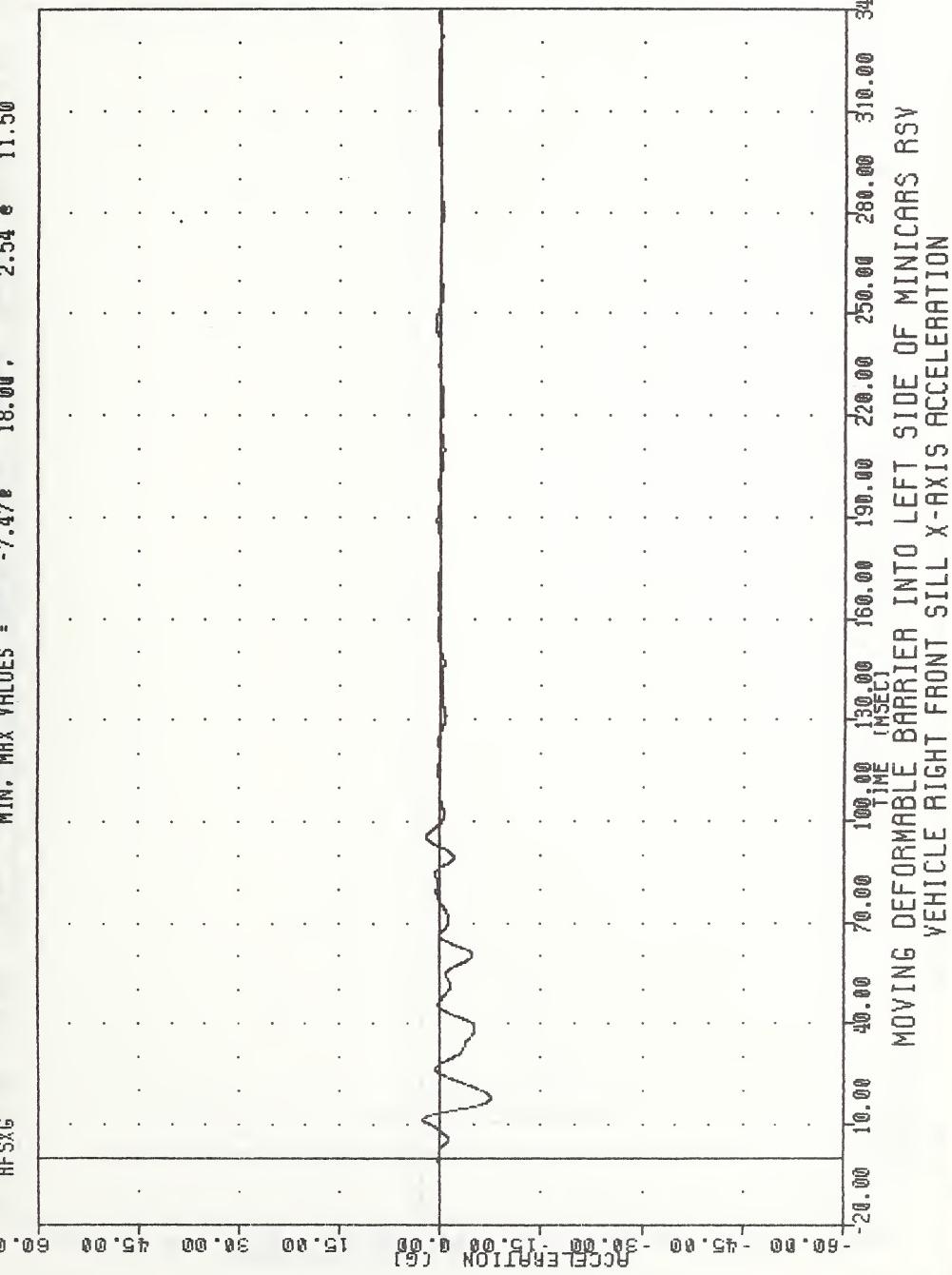


VRTC
LEFT SIDE IMPACT

91140

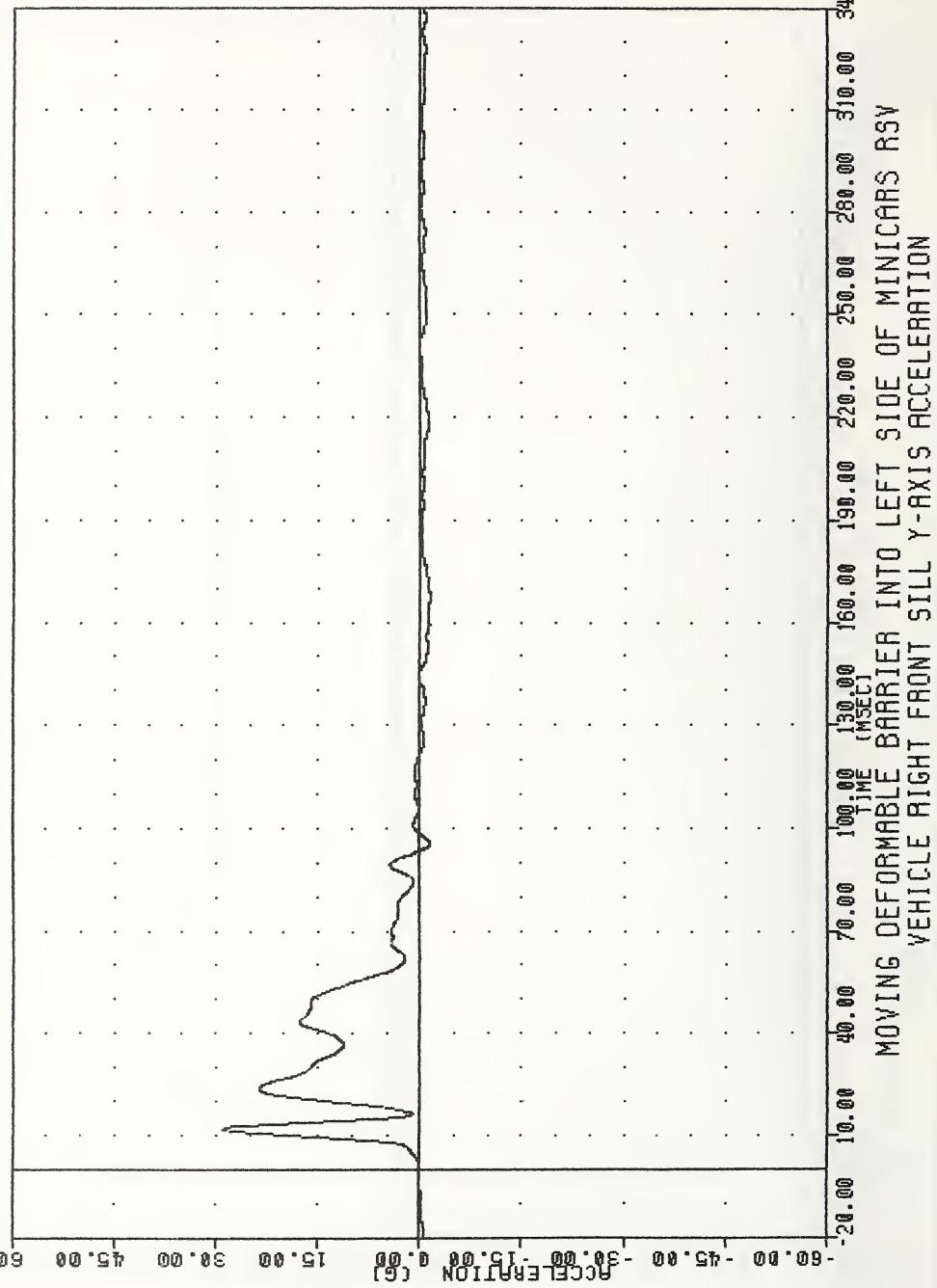
AFSX6

FILTER = BLPF 100/ 316/-40
MIN. MAX VALUES = -7.47@ 18.00 , 2.54 @ 11.50



VRTC = 910520
LEFT SIDE IMPACT
9114@ RFSYG

FILTER = BLPF 100/ 316/ -40
MIN, MAX VALUES = -1.47@ 95.50 .
28.92 @ 11.75

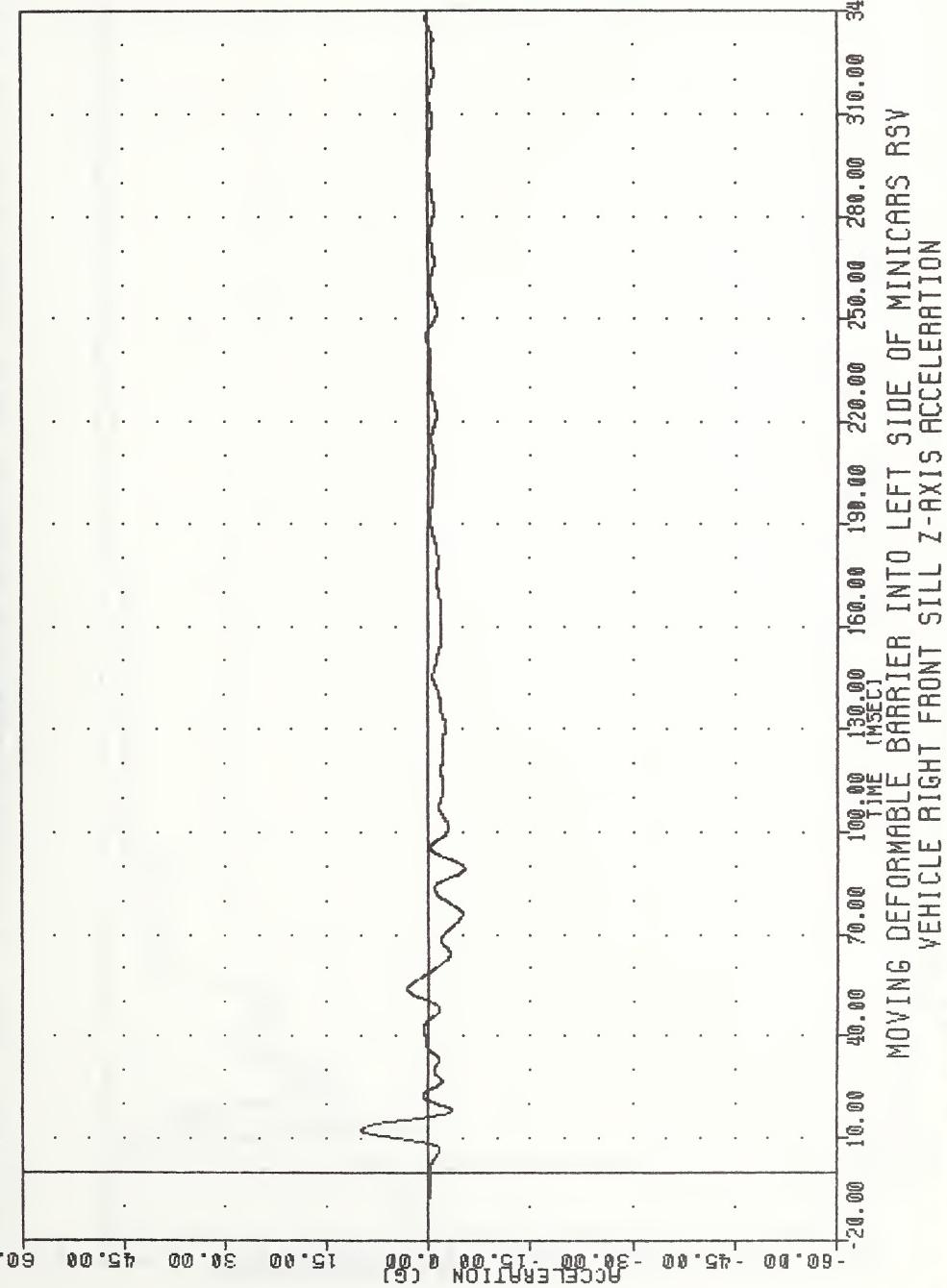


WRTC , 910520
LEFT SIDE IMPACT

91140
AFS76

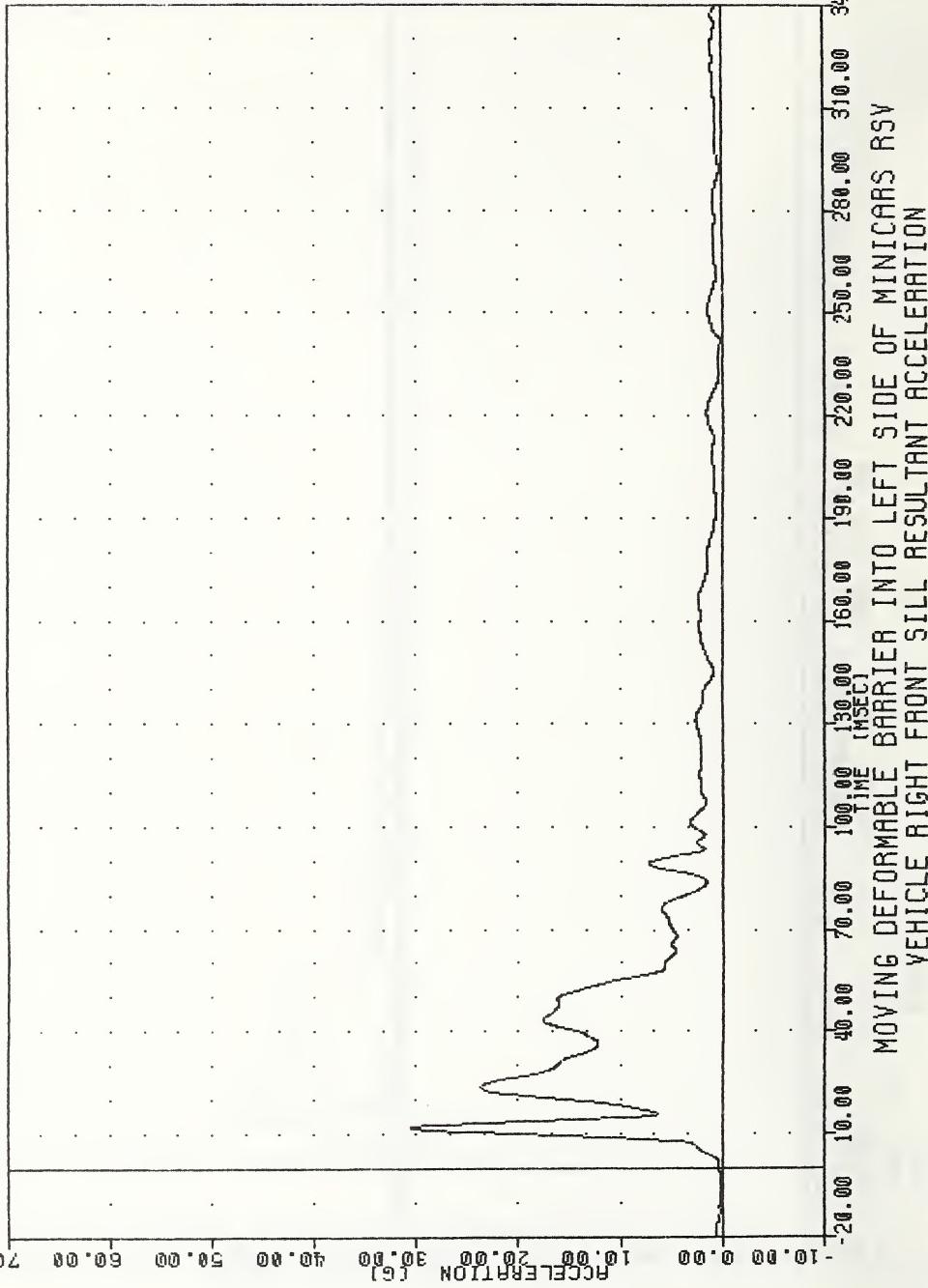
FILTER = BLPF
MIN, MAX VALUES = -5.278 89.25 ,
100/ -40

9.82 & 12.50



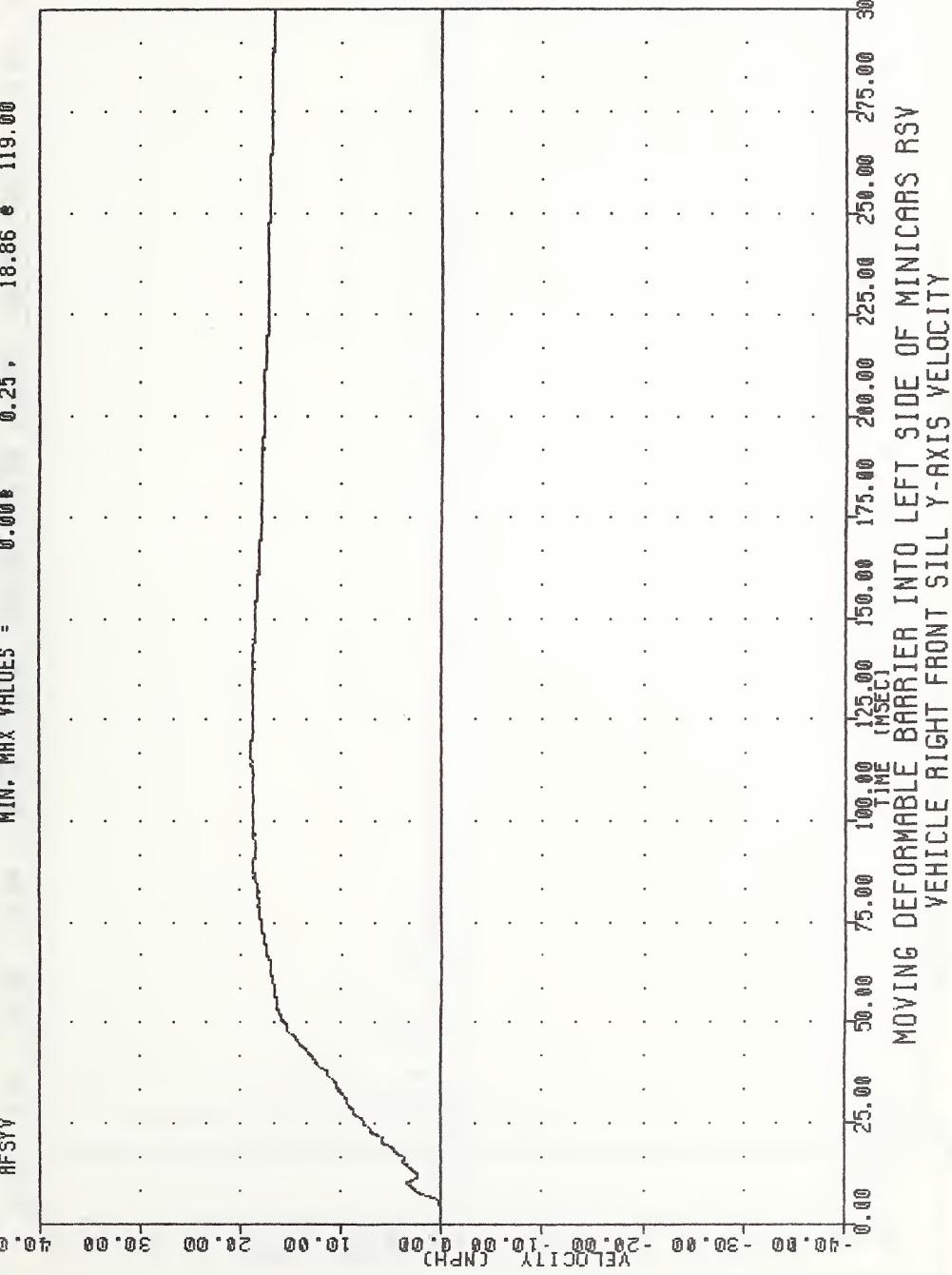
VRTC 910520
LEFT SIDE IMPACT
9114@ RFSRC

FILTER = BLPF 100/ 316/-40
MIN. MAX VALUES = 0.12@ 242.00 ,
30.54 @ 11.75



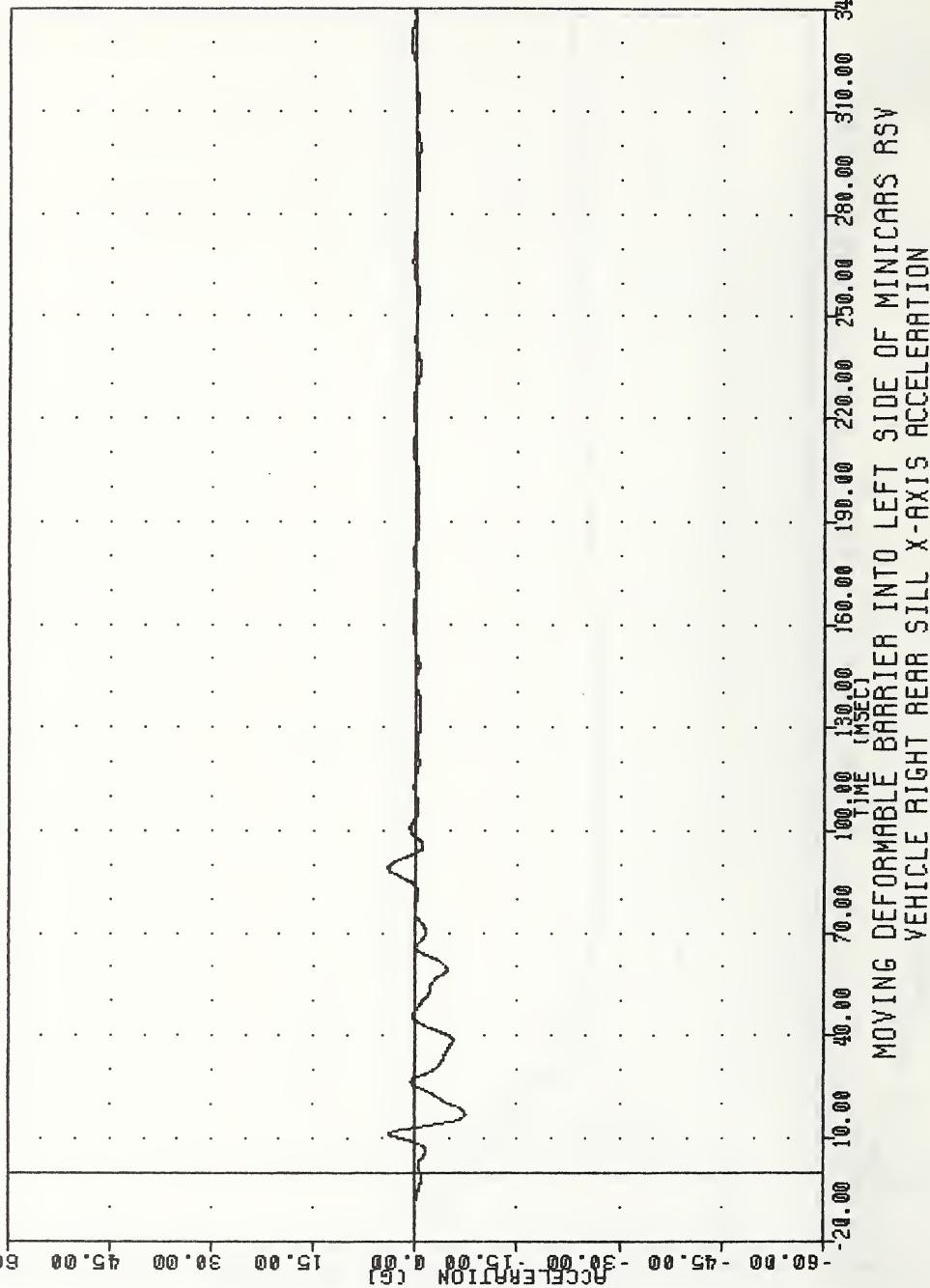
VRTC 910520
LEFT SIDE IMPACT
9114@ AFSY

FILTER = ALPF 1650/ 5214/ -40
MIN. MAX VALUES = 0.00@ 0.25 , 18.86 @ 119.00



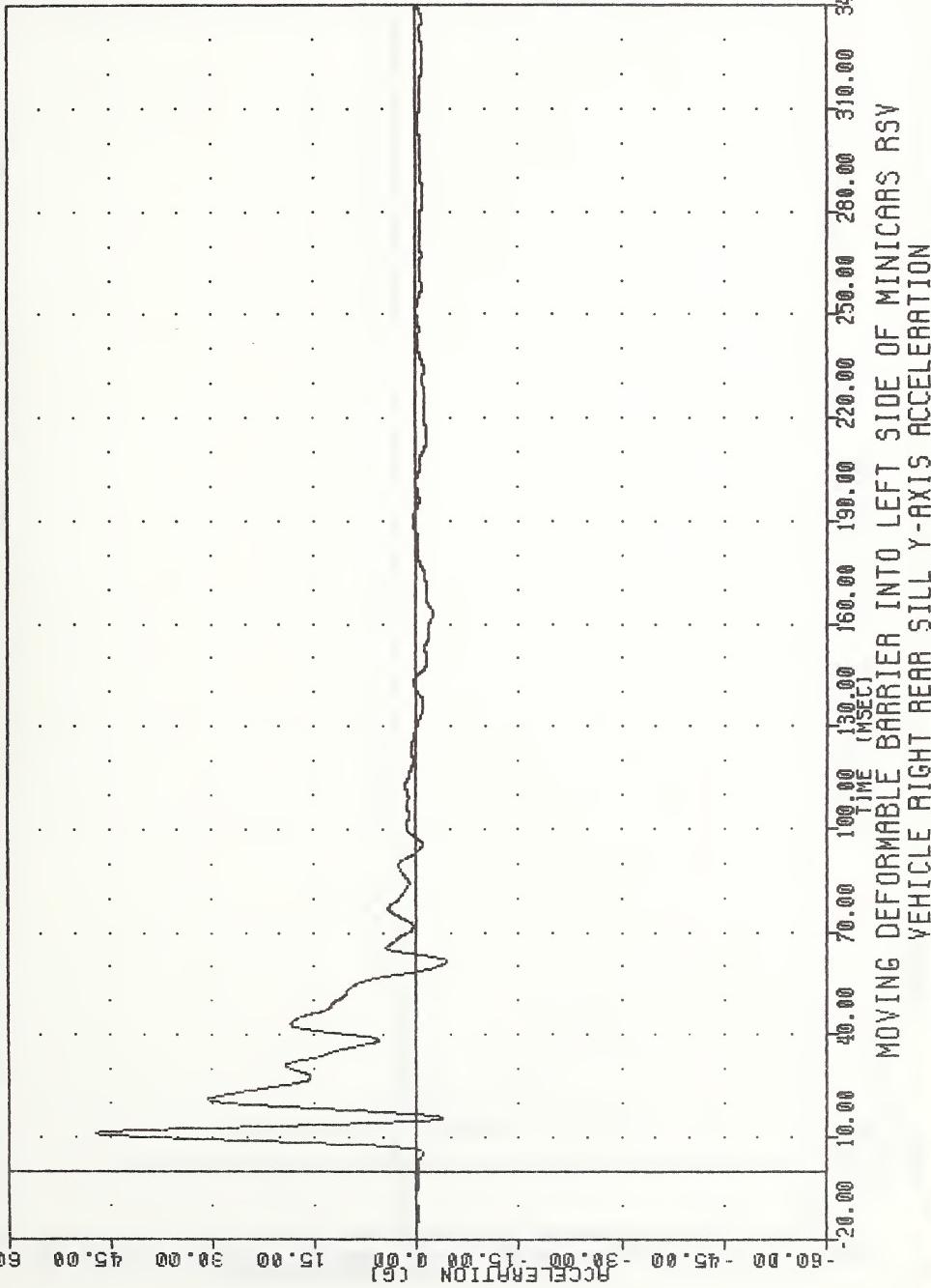
YRTC
LEFT SIDE IMPACT
91140
AB3X6

FILTER = BLPP 100/ -40
MIN, MAX VALUES = -7.420 16.88 , 4.07 & 89.00



YRTC
LEFT SIDE IMPACT
9114@ ARSIG

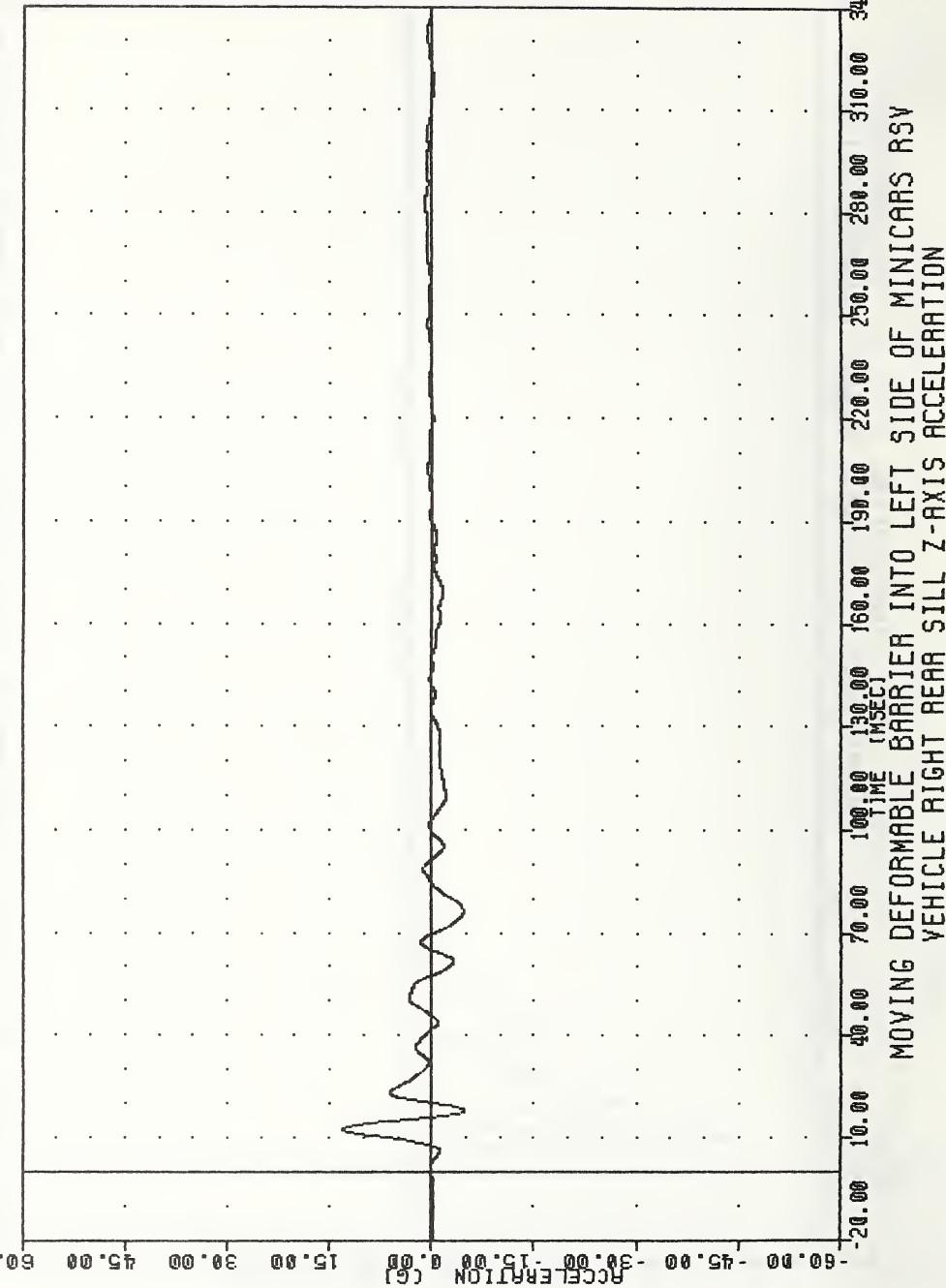
910520
FILTER = BLPF 100/
MIN. MAX VALUES = -4.39@ 61.63@
47.28@ 11.00@



VRTC
LEFT SIDE IMPACT
9114@
RHSZ6

FILTER = BLPF 100/ 316/-40
MIN, MAX VALUES = -4.82@ 17.88 ,

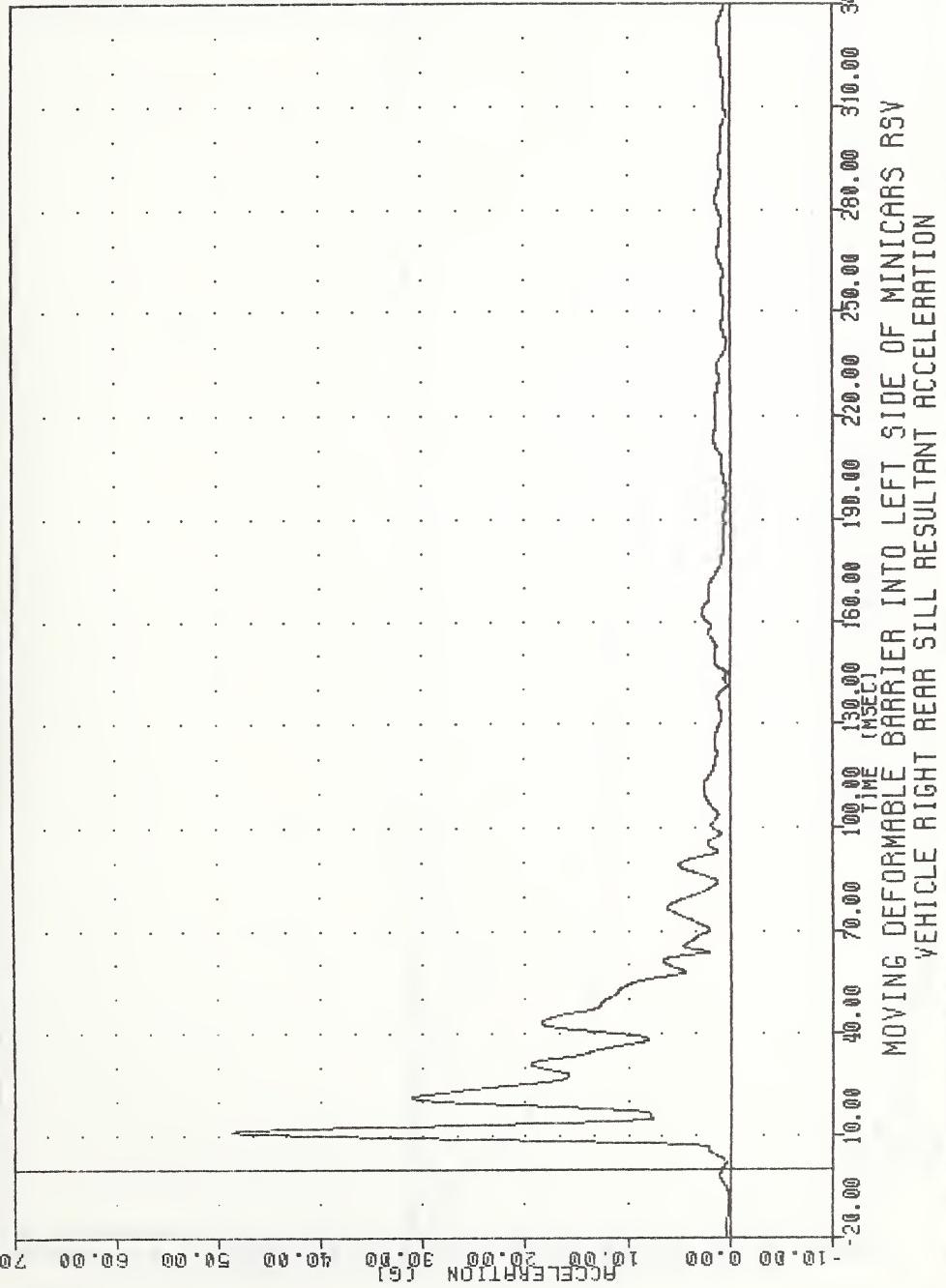
12.99 @ 12.38



WTC
LEFT SIDE IMPACT
91140 ARSRS

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = 0.098 -8.88 ,

48.65 & 11.13

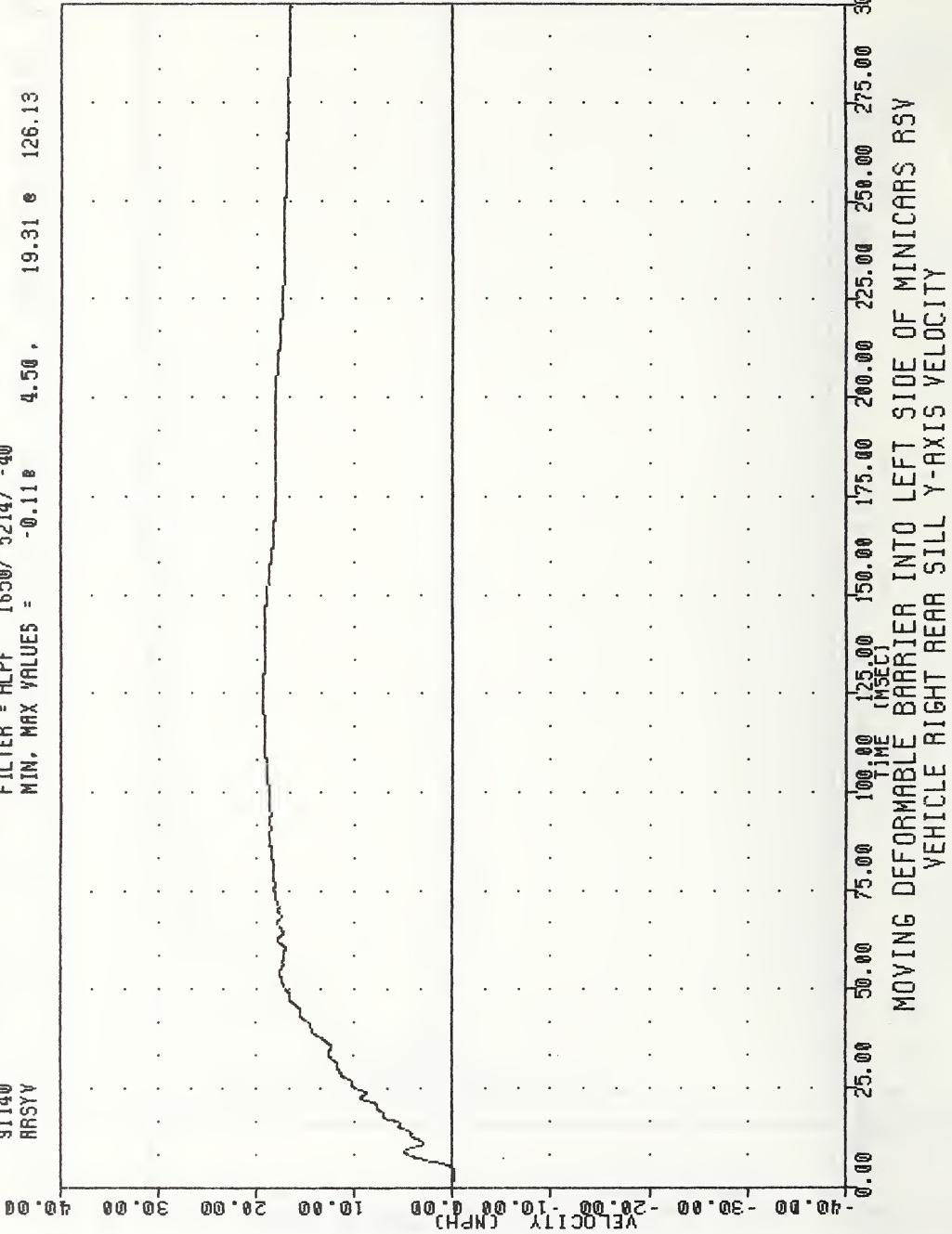


VRTC 910520
LEFT SIDE IMPACT

91140
RSTYV

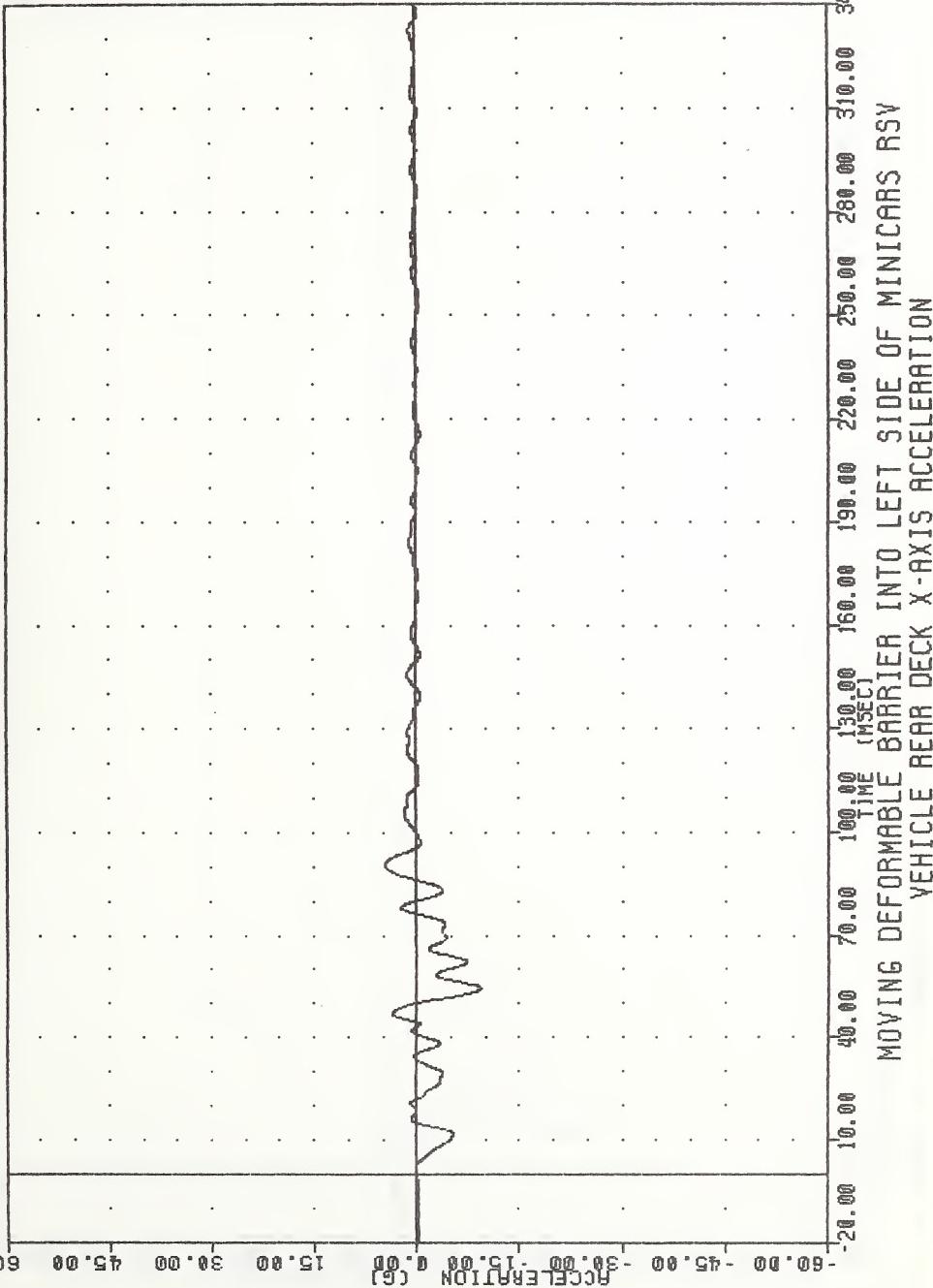
FILTER = ALPF 1650/ 5214/ -40
MIN., MAX VALUES = -0.11@ 4.50 .

19.31 @ 126.13



YRTC
LEFT SIDE IMPACT
9114@
ADKXG

910520
FILTER = BLPF
MIN. MAX VALUES = 100/ -40
-9.35@ 54.50 , 4.53 @ 90.50



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
VEHICLE REAR DECK X-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
91140
RDKG

FILTER = BLPP
MIN, MAX VALUES = -1.82 149.13 ,
30.27 & 11.13

910520

60.00

55.00

50.00

45.00

40.00

35.00

30.00

25.00

20.00

15.00

10.00

5.00

0.00

-5.00

-10.00

-15.00

-20.00

-25.00

-30.00

-35.00

-40.00

-45.00

-50.00

-55.00

60.00

55.00

50.00

45.00

40.00

35.00

30.00

25.00

20.00

15.00

10.00

5.00

0.00

-5.00

-10.00

-15.00

-20.00

-25.00

-30.00

-35.00

-40.00

-45.00

-50.00

-55.00

-60.00

-65.00

-70.00

-75.00

-80.00

-85.00

-90.00

-95.00

-100.00

-105.00

-110.00

-115.00

-120.00

-125.00

-130.00

-135.00

-140.00

-145.00

-150.00

-155.00

-160.00

-165.00

-170.00

-175.00

-180.00

-185.00

-190.00

-195.00

-200.00

-205.00

-210.00

-215.00

-220.00

-225.00

-230.00

-235.00

-240.00

-245.00

-250.00

-255.00

-260.00

-265.00

-270.00

-275.00

-280.00

-285.00

-290.00

-295.00

-300.00

-305.00

-310.00

-315.00

-320.00

-325.00

-330.00

-335.00

-340.00

MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
VEHICLE REAR DECK Y-AXIS ACCELERATION

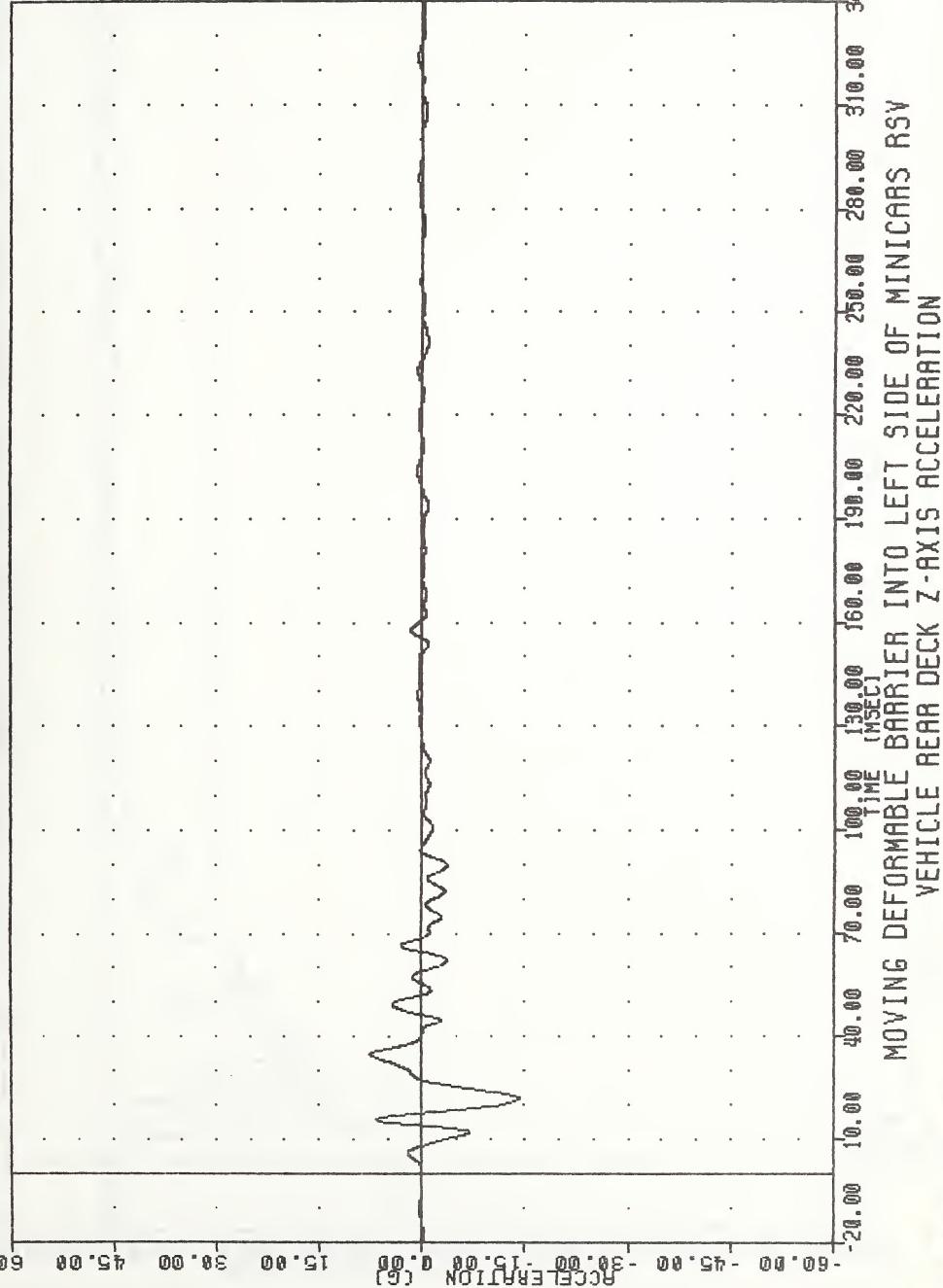
WRTC 910520

LEFT SIDE IMPACT

9140

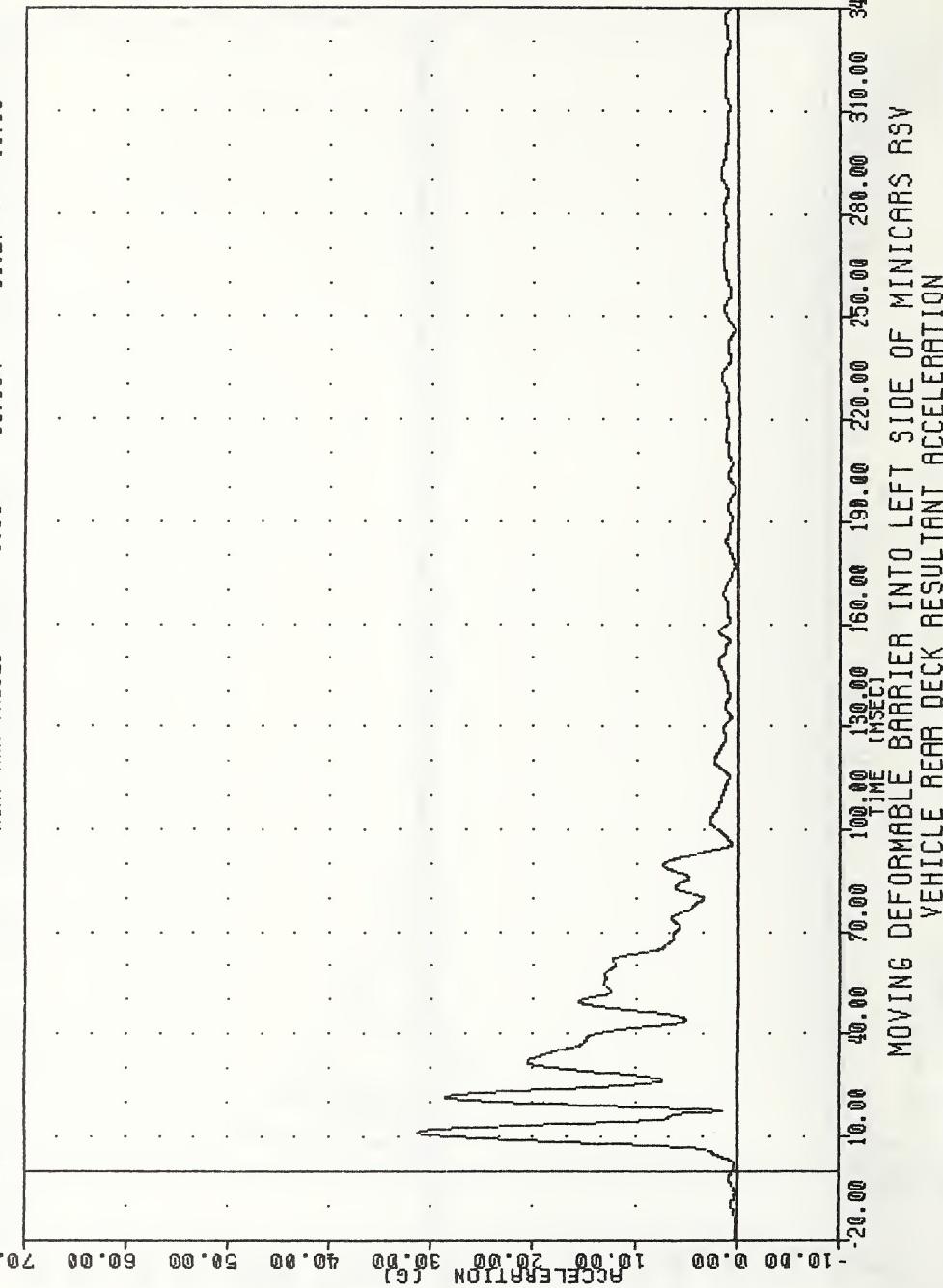
ADKZ6

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -14.098 21.88 . 7.58 e 34.88



VRTC
LEFT SIDE IMPACT
9114@
ADKRG

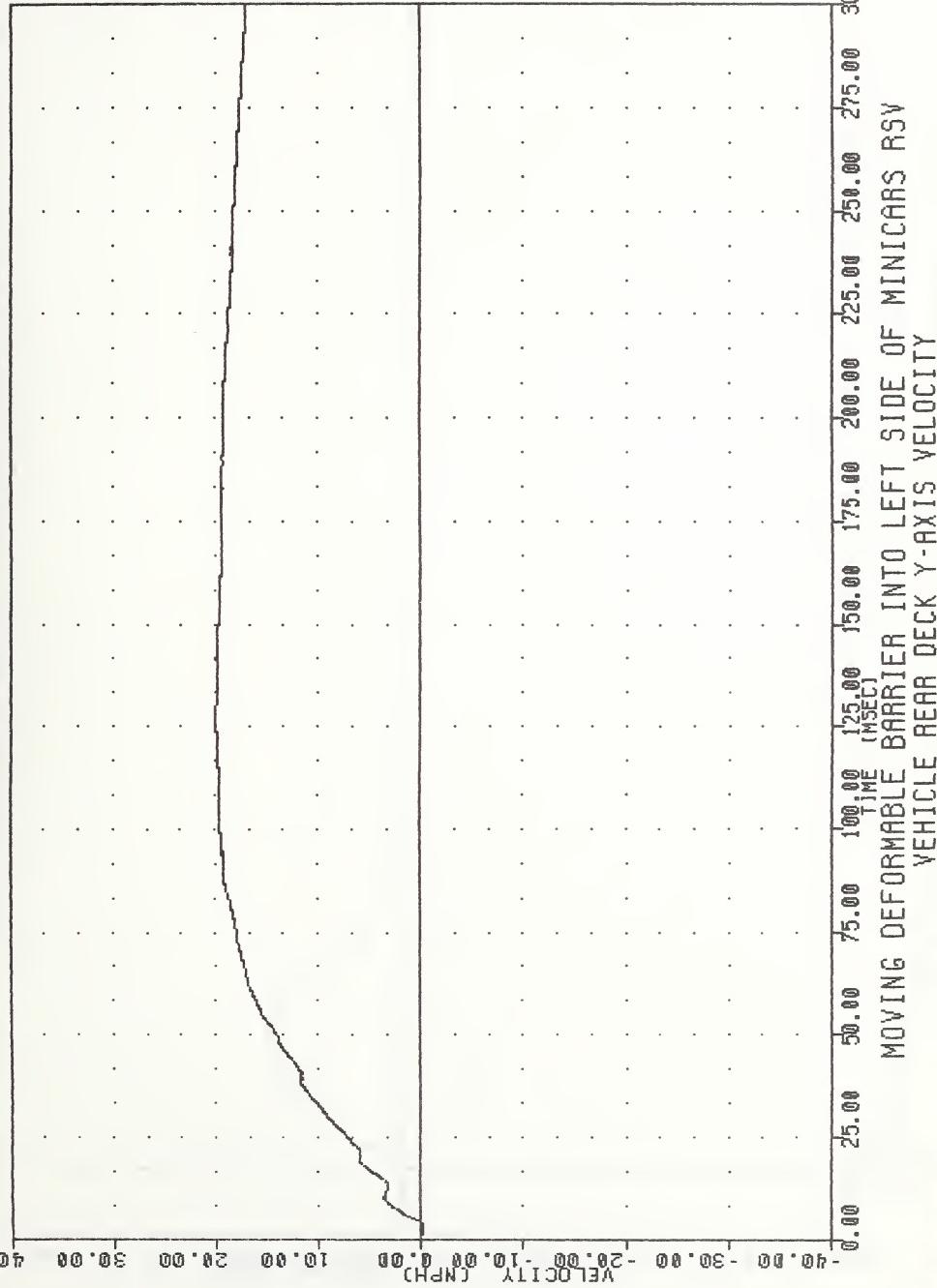
910520
FILTER = BLPF
MIN. MAX VALUES = 100/-100
0.14@ -15.5@ , 31.27 @ 11.13



VRTC
91052@
LEFT SIDE IMPACT
9114@
RDKYV

FILTER = ALPF 1650/ 5214/ -4@
MIN, MAX VALUES = -0.115@ 2.75 ,

19.93 @ 126.50



YRTC : 910520
LEFT SIDE IMPACT
91140
BCGX6

FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -19.850 40.50 . 1.69 & 132.50

60. 00

50. 00

45. 00

40. 00

35. 00

30. 00

25. 00

20. 00

15. 00

10. 00

5. 00

0. 00

-5. 00

-10. 00

-15. 00

-20. 00

-25. 00

-30. 00

-35. 00

-40. 00

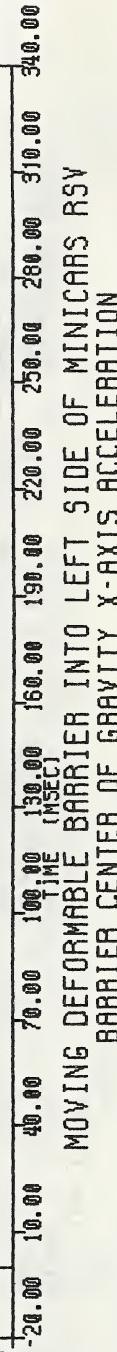
-45. 00

-50. 00

-55. 00

-60. 00

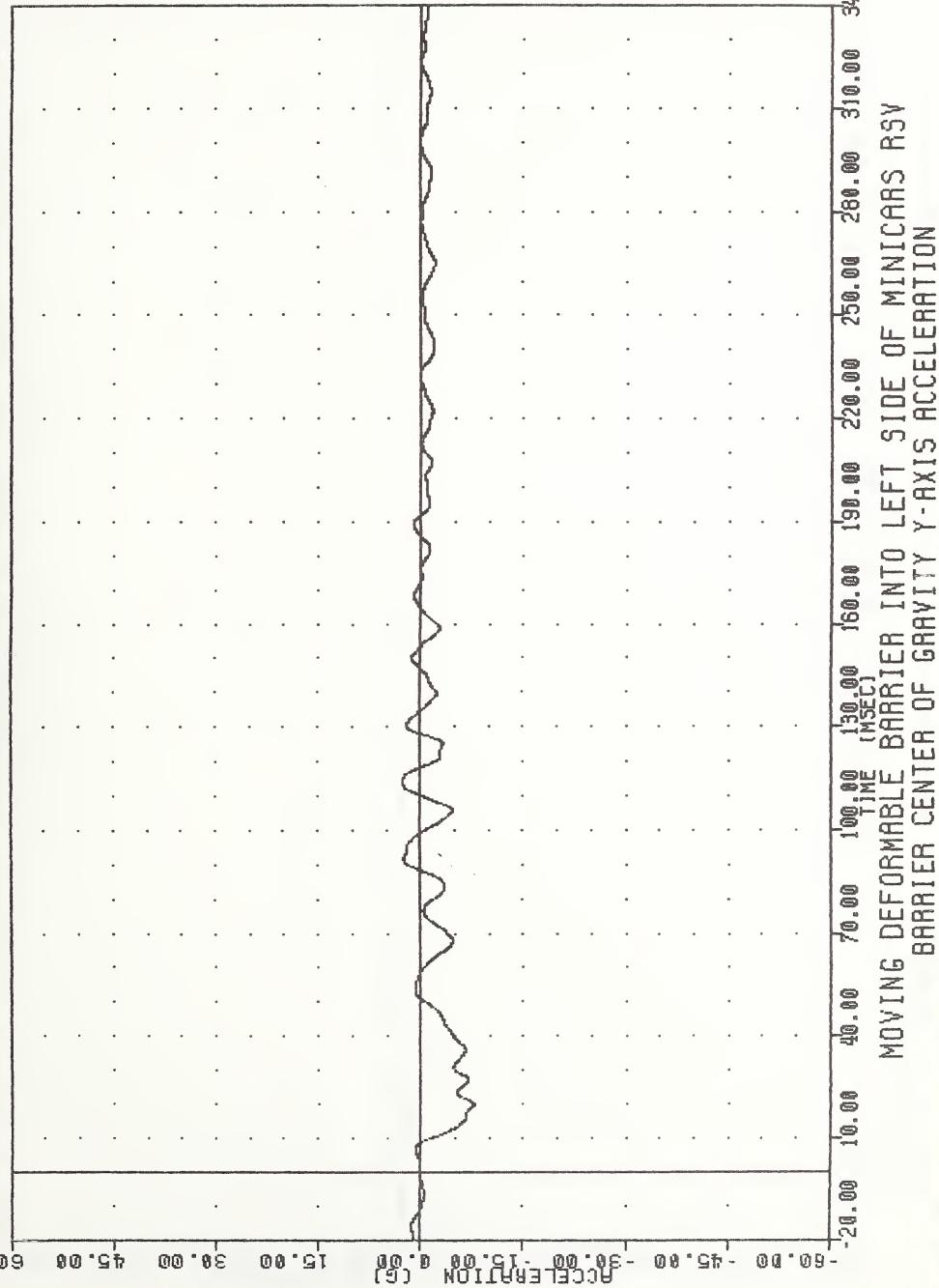
ACCELERATION (G)



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
BARRIER CENTER OF GRAVITY X-AXIS ACCELERATION

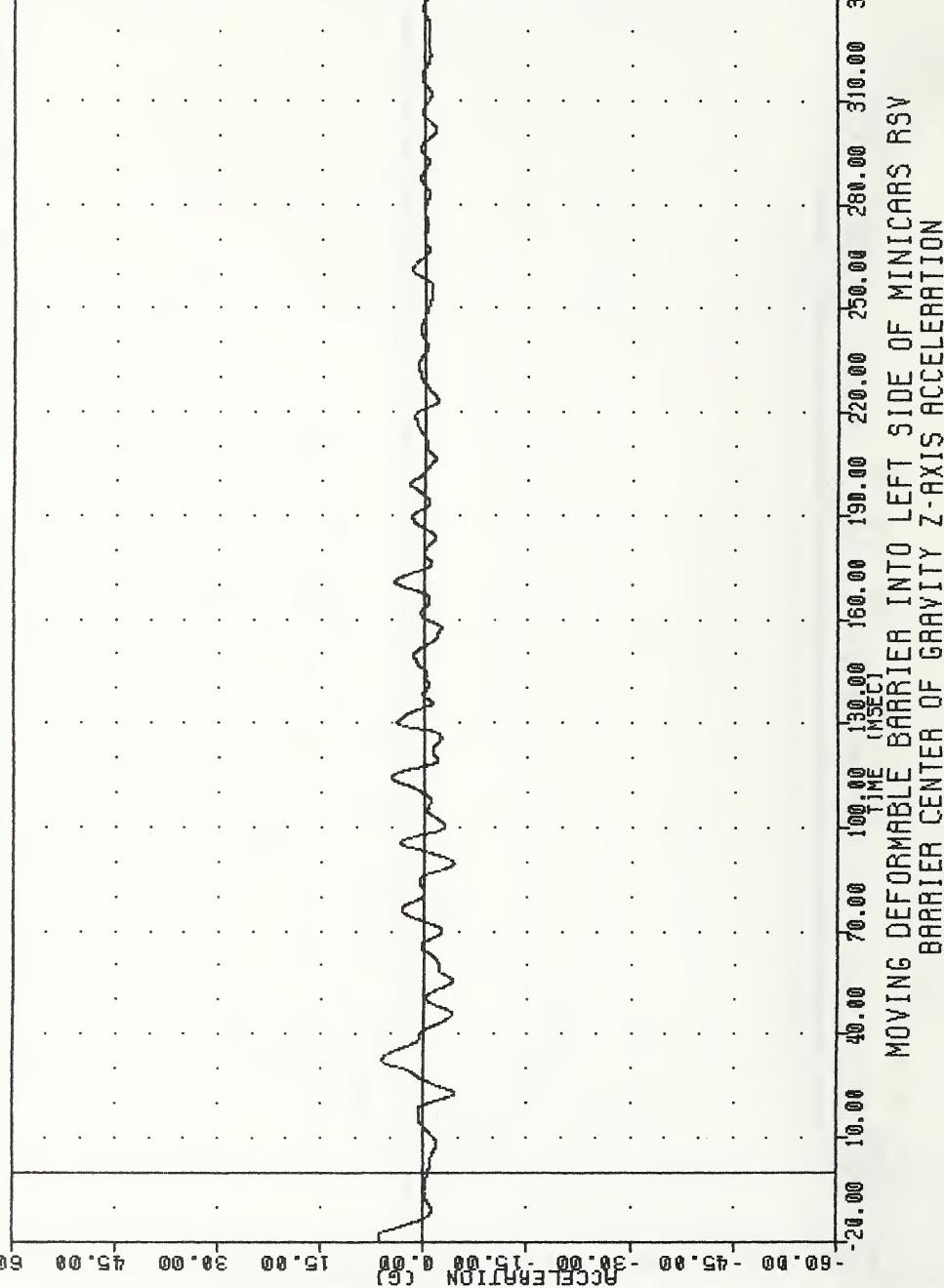
VRTC * 91052@
LEFT SIDE IMPACT
9114@
BCGYG

FILTER = BLPF 100/ 316/ -4@
MIN. MAX VALUES = -7.83@ 19.75 . 2.57 @ 114.63



VRTC
LEFT SIDE IMPACT
91140
BCGZG

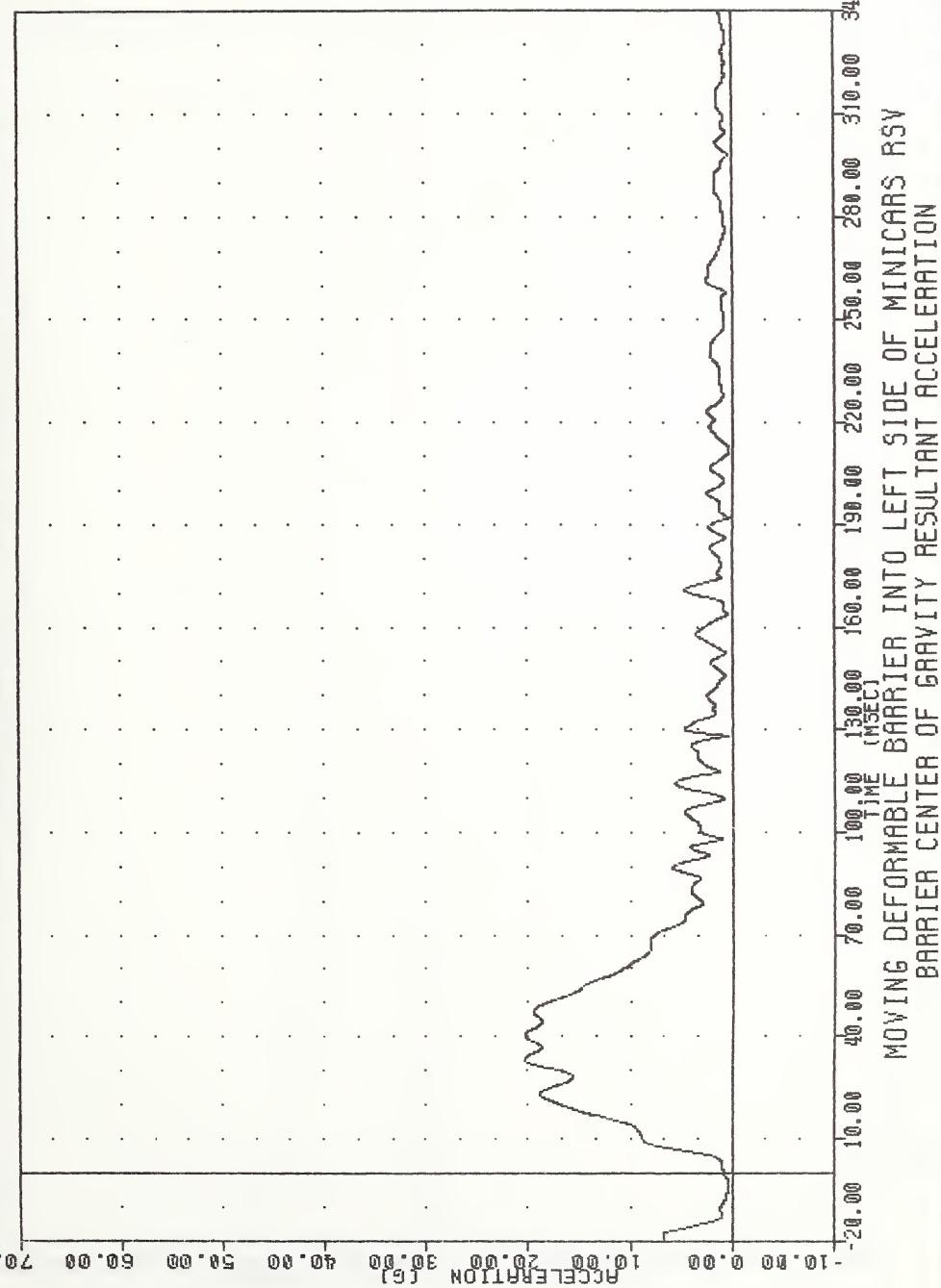
FILTER = BLPF 100/ -40
MIN, MAX VALUES = -4.438 22.75 ,
6.52 6 -20.00



VRTC
910520
LEFT SIDE IMPACT
91140

BCGRS

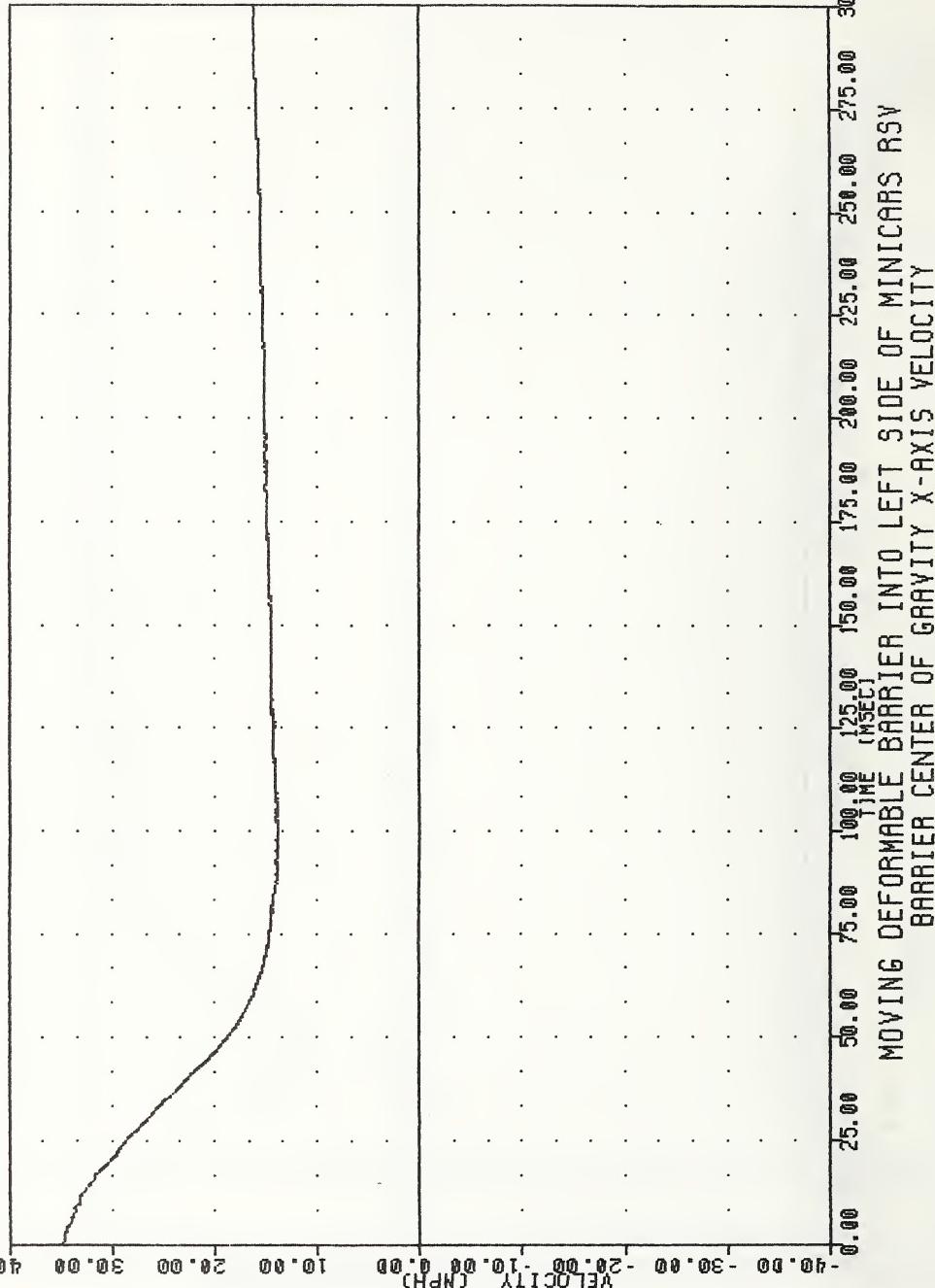
FILTER = BLPP
MIN. MAX VALUES = 0.188 192.00 .
20.37 e 40.38



WRTIC
LEFT SIDE IMPACT
9114@
BCXXY

FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = 13.81@ 100.25,

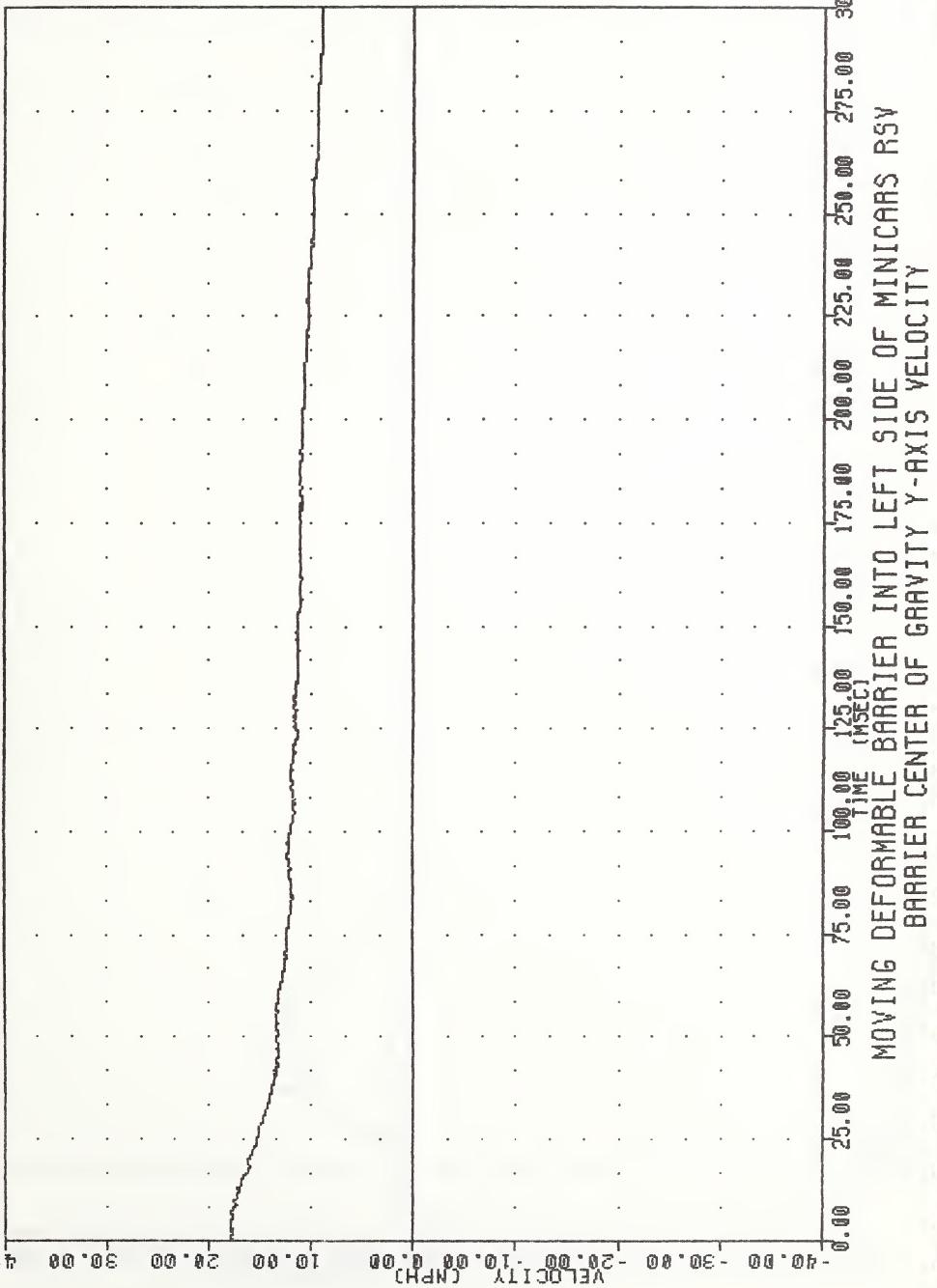
34.80 @ 0.38



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
BARRIER CENTER OF GRAVITY X-AXIS VELOCITY

WRTC 91052@
LEFT SIDE IMPACT
91140 BC6YW

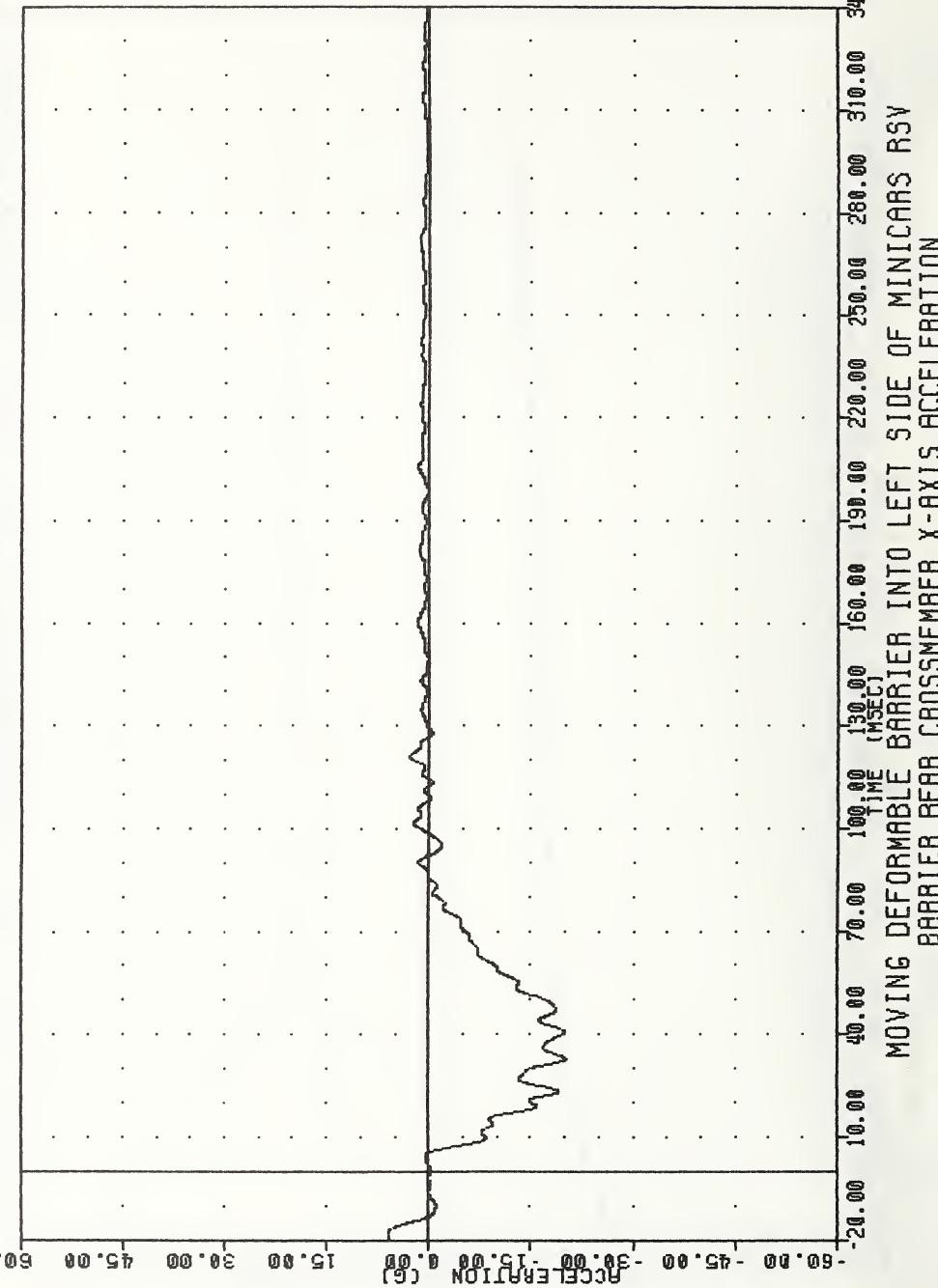
FILTER = FILPF 1650/ 5214/-40
MIN, MAX VALUES = 8.988 297.38 , 17.91 @ 6.75



VRTC
LEFT SIDE IMPACT
9114@
BRCX6

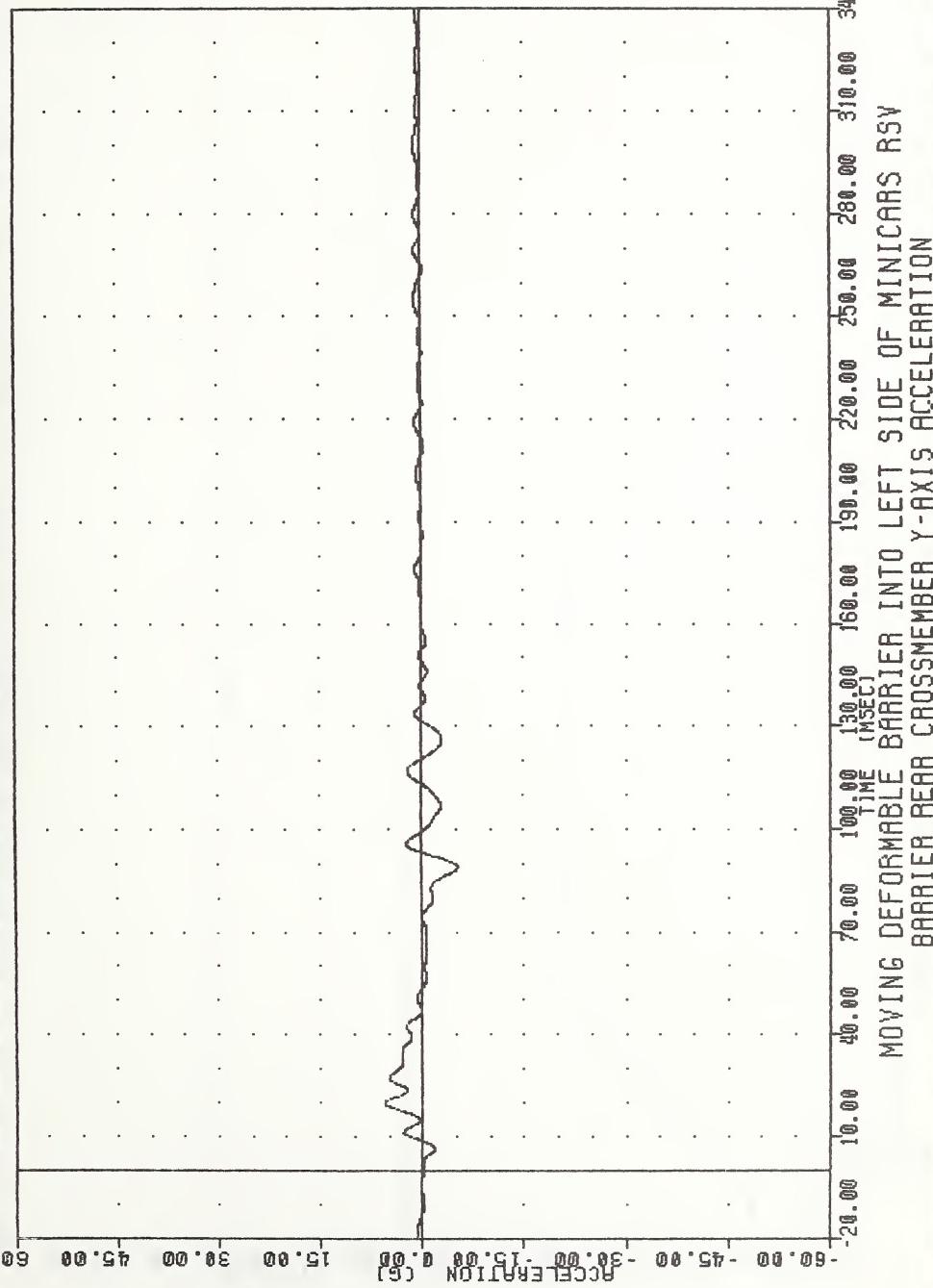
FILTER = BLPF 100/ 316/ -40
MIN. MAX VALUES = -20.12@ 32.88 , 5.87 @ -18.50

5.87 @ -18.50



VRTC 910520
LEFT SIDE IMPACT
91140
BRCY6

FILTER = BLPF 100/
MIN. MAX VALUES = -5.208 88.88,
5.63 e 19.75



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
BARRIER REAR CROSSMEMBER Y-AXIS ACCELERATION

VRTC
LEFT SIDE IMPACT
9114@
BRCKXV

91052@
MIN. MAX VALUES = 15.11@ 80.63 , 34.72 @ 0.75

FILTER = ALFFF 165@/ 5214/ -4@

-40.00 -30.00 -20.00 -10.00 0.00 10.00 20.00 30.00 40.00
VELOCITY (MPH)

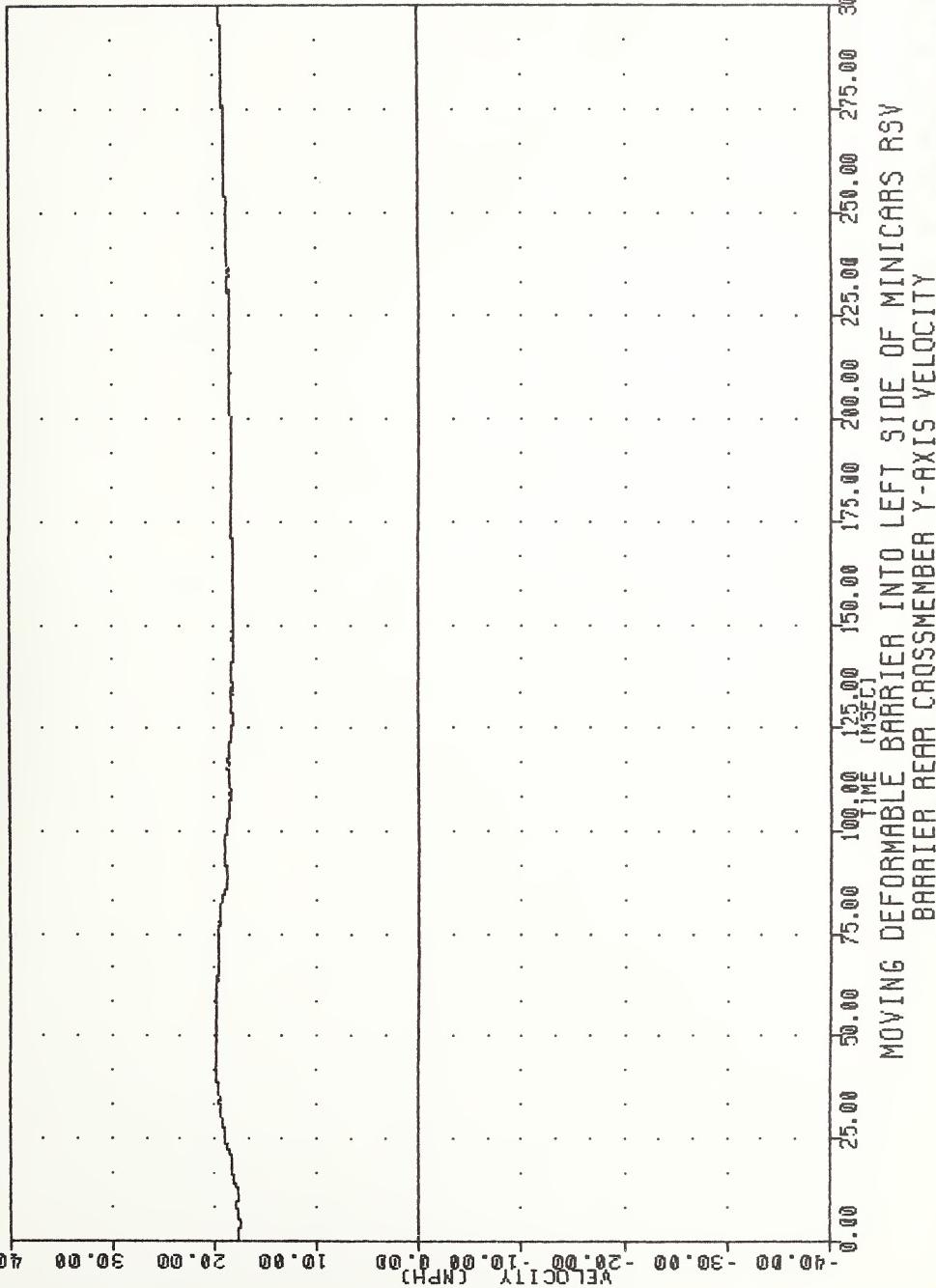


0.00 25.00 50.00 75.00 100.00 125.00 150.00 175.00 200.00 225.00 250.00 275.00 300.00
MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
BARRIER REAR CROSSMEMBER X-AXIS VELOCITY

VRTC 910520
LEFT SIDE IMPACT
9114@ BRCYV

FILTER = ALPF 1650/ 5214/ -40
MIN, MAX VALUES = 17.35@ 4.25 ,

19.83 @ 48.13



MOVING DEFORMABLE BARRIER INTO LEFT SIDE OF MINICARS RSV
BARRIER REAR CROSSMEMBER Y-AXIS VELOCITY

APPENDIX C

DUMMY CERTIFICATION

DRIVER DUMMY

DUMMY NO.: 02

BIOSID EXTERIOR DIMENSIONS

Dummy Serial No.: 02 Dummy Manufacturer: Humanetics
Test/Calibration No.: CAL08 Calibration Date: 05/16/91

Dimensional Symbol	Description	Specified Dimension	Dummy Dimension
A	Total Sitting Height	34.6 - 35.0	<u>35.2*</u>
B	Shoulder Pivot Height	19.9 - 20.5	<u>20.4</u>
C	"H" Point Height	3.5 - 4.0	<u>3.8</u>
D	"H" Point from Seat Back	5.2 - 5.5	<u>5.3</u>
E	Shoulder Pivot from Backline	5.2 - 5.8	<u>5.2</u>
F	Thigh Clearance	5.5 - 6.1	<u>5.8</u>
G	Skull Cap to Backline	3.2 - 3.4 (Ref.)	<u>3.3</u>
H	Shoulder Height	22.0 - 22.4	<u>22.0</u>
J	Knee Pivot Height	19.1 - 19.7	<u>19.4</u>
K	Buttock Knee Length	22.8 - 23.8	<u>21.0**</u>
L	Foot Length	9.9 - 10.5	<u>10.1</u>
M	Foot Breadth	3.6 - 4.2	<u>3.9</u>
N	Location for Chest Measurements	16.0 (Ref.)	<u>16.0</u>
O	Chest Depth	10.6 - 11.0	<u>10.5*</u>
P	Chest Circumference with Pad	39.8 - 41.0	<u>41.5*</u>
R	Hip Width at "H" Point	14.5 - 15.5	<u>14.6</u>
S	Shoulder Width	16.2 - 16.8	<u>16.4</u>

*Dummy did not meet all specifications.

**The specified dimensions have been incorrectly published in the Biosid User's Manual, March 1991.

TRANSPORTATION RESEARCH CENTER OF OHIO

SHOULDER IMPACT - LINEAR IMPACTOR TEST

BIOSID DUMMY

14-May-91

LEFT SIDE CONFIGURATION

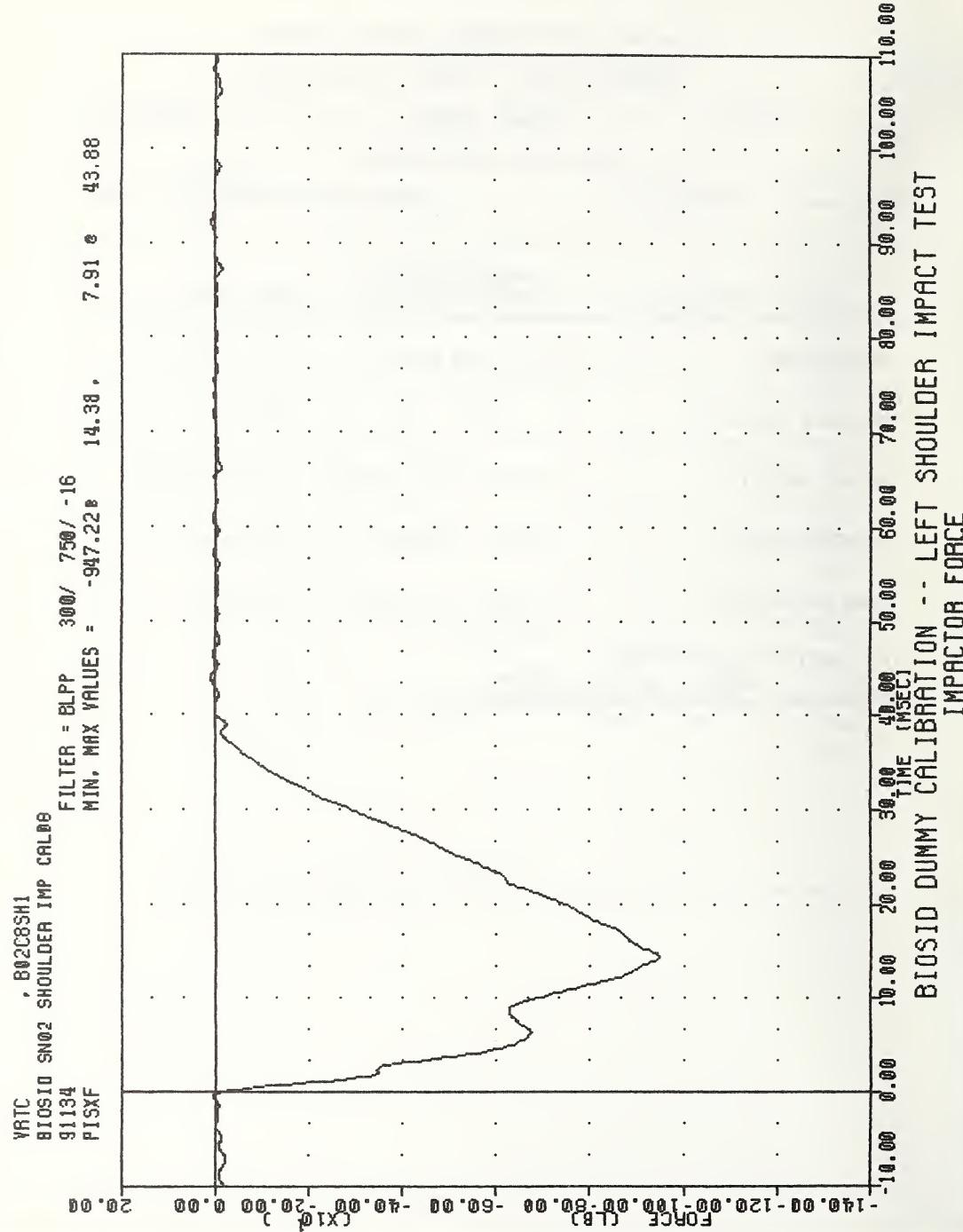
VRTC B02C8SH1

BIOSID SN02 SHOULDER IMP CAL08

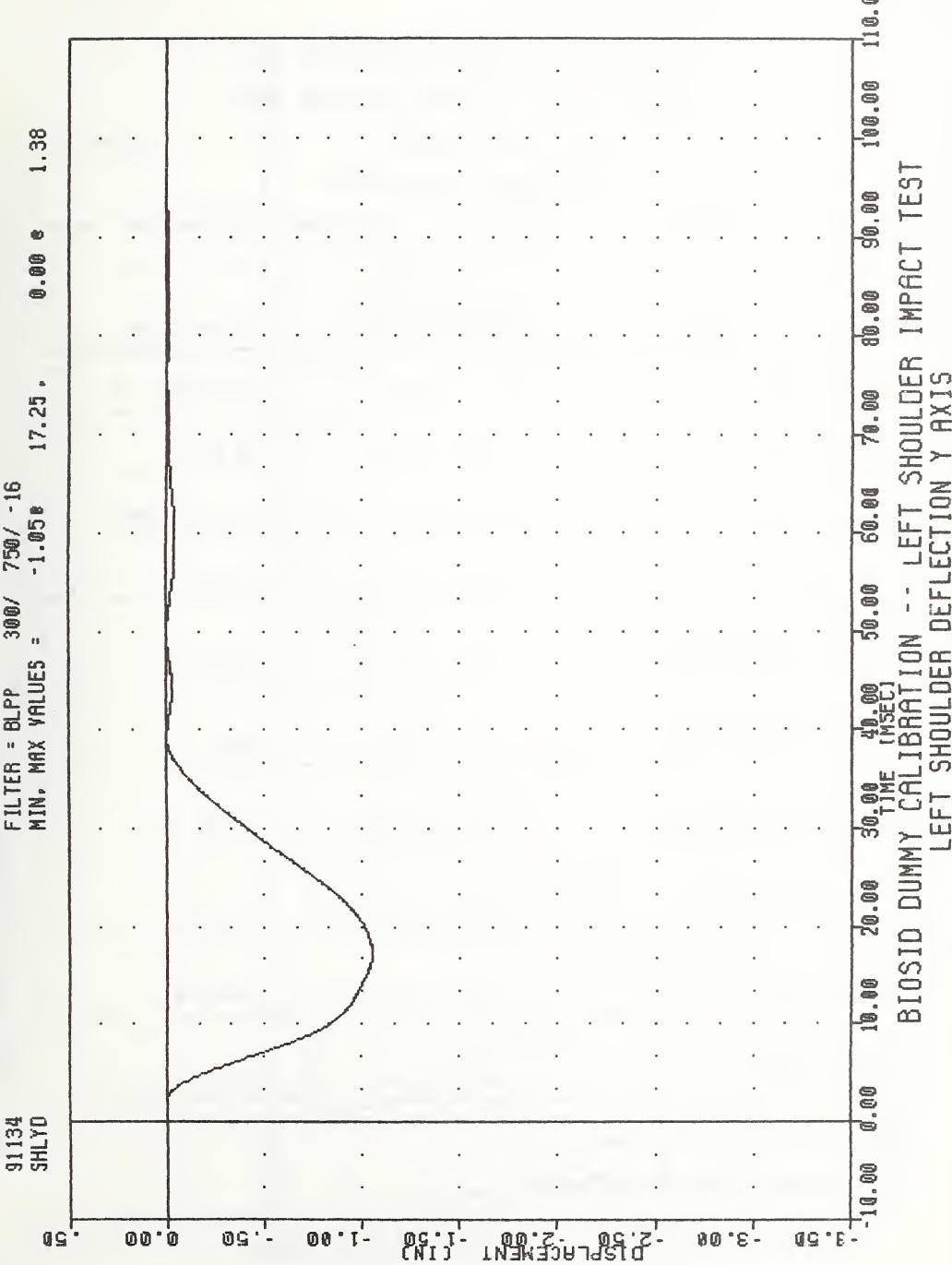
TEST PARAMETER	SPECIFICATION	TEST RESULTS
	(ABSOLUTE VALUE)	
TEMPERATURE	69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	53.00 %
IMPACT VELOCITY	14.47-15.06 FT/SEC	14.81 FT/SEC
IMPACTOR FORCE	809 - 1012 LB	-947, LB
PEAK DEFLECTION	0.83 - 1.15 IN	-1.05 IN

TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middlecamp



VRTC
BIOSID SNO02 SHOULDER IMP CAL08
91134
SHLYD



TRANSPORTATION RESEARCH CENTER OF OHIO
ABDOMEN IMPACT - LINEAR IMPACTOR TEST

BIOSID DUMMY

14-May-91

LEFT SIDE CONFIGURATION

VRTC B02CBAB1 BIOSID SNO2 ABDOMEN IMP CAL08

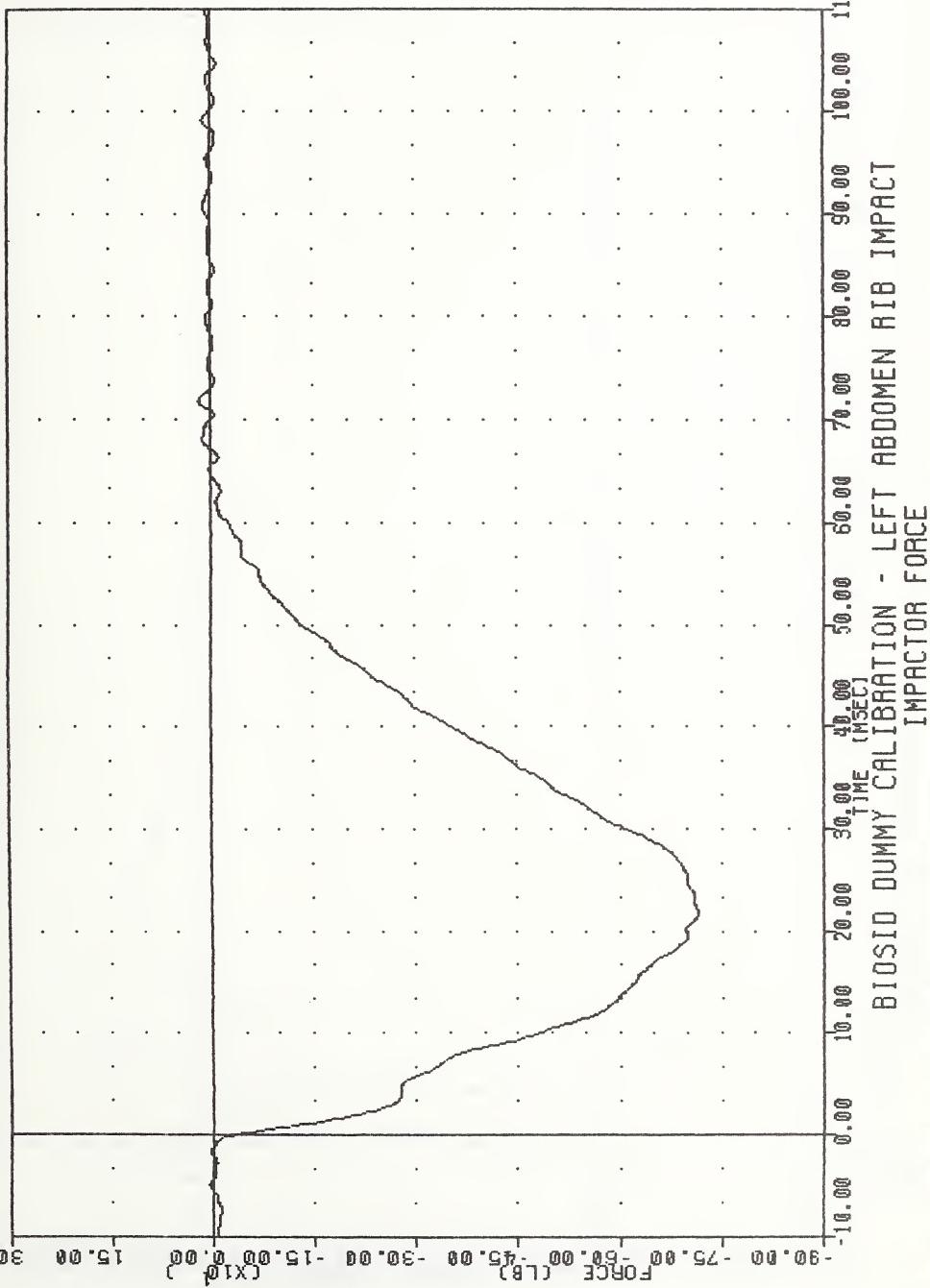
TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
TEMPERATURE	69 - 72 DEG. F	71.00 DEG. F
RELATIVE HUMIDITY	10% - 70%	53.00 %
IMPACT VELOCITY	14.47-15.06 FT/SEC	14.81 FT/SEC
IMPACTOR FORCE	652 - 787 LB	-716. LB
PEAK ACCELERATION UPPER ABDOMINAL RIB	54 - 87 G	-79.6 G
PEAK ACCELERATION LOWER ABDOMINAL RIB	54 - 87 G	-80.6 G
PEAK DISPLACEMENT UPPER ABDOMINAL RIB	1.50 - 2.00 IN	-1.89 IN
PEAK DISPLACEMENT LOWER ABDOMINAL RIB	1.50 - 2.00 IN	-1.78 IN
PEAK ACCELERATION UPPER SPINE	5.5 - 8.2 G	-6.9 G
PEAK ACCELERATION LOWER SPINE	8.0 - 10.7 G	-9.0 G

TEST MEETS SPECIFICATIONS

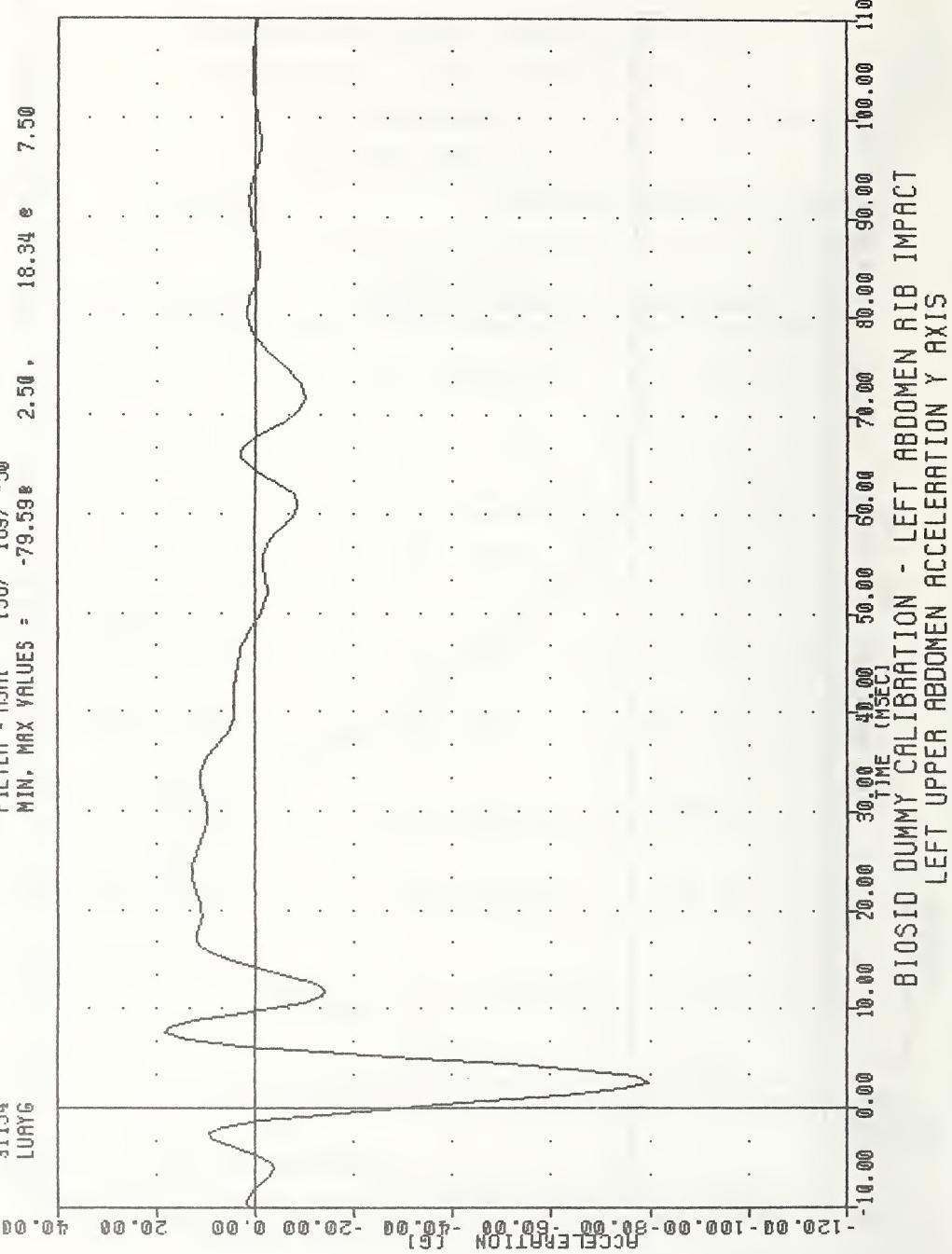
TECHNICIAN Chas Middelht

VRTC B02C8AB1
BIOSID SNO2 ABDOMEN IMP CAL08
91134
PISXF

FILTER = BLPP 300/ 750/ -16
MIN, MAX VALUES = -716.458 21.88 , 17.46 • 71.88

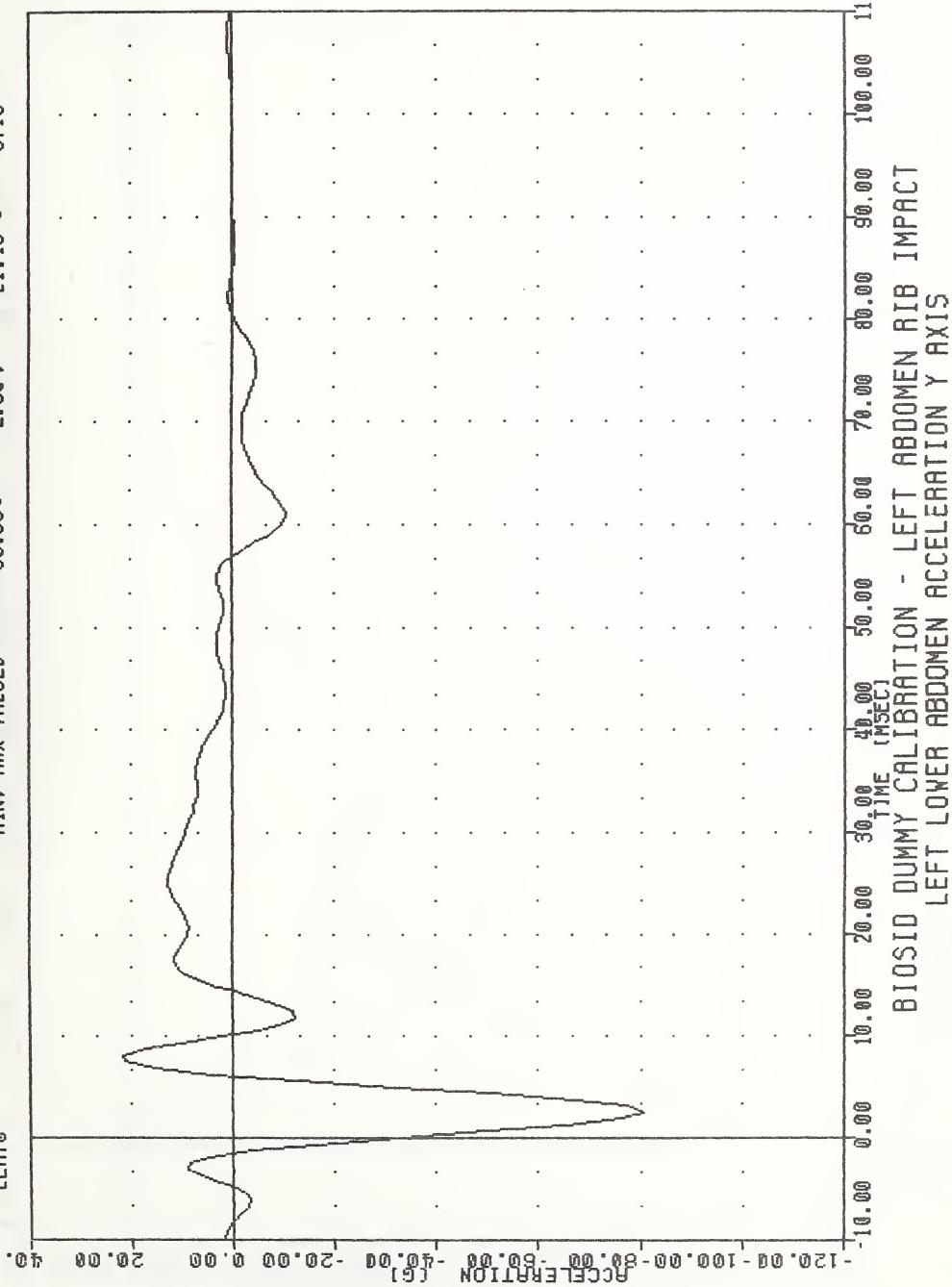


YRTC BIOSID SN02 ABDOMEN IMP CAL0B
91134 FILTER = HSRI 136/ 189/-50
LURYG MIN. MAX VALUES = -79.59@ 2.5@
 18.34 @ 7.5@

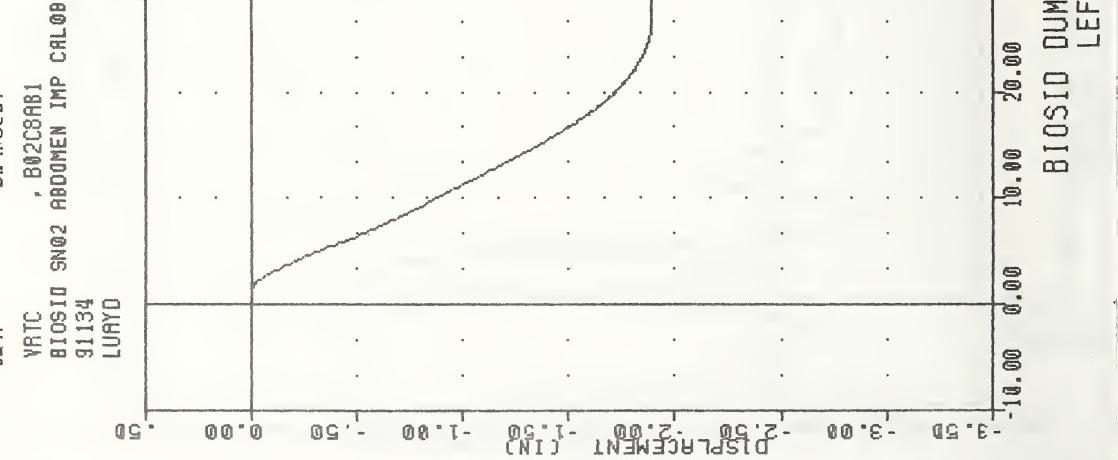


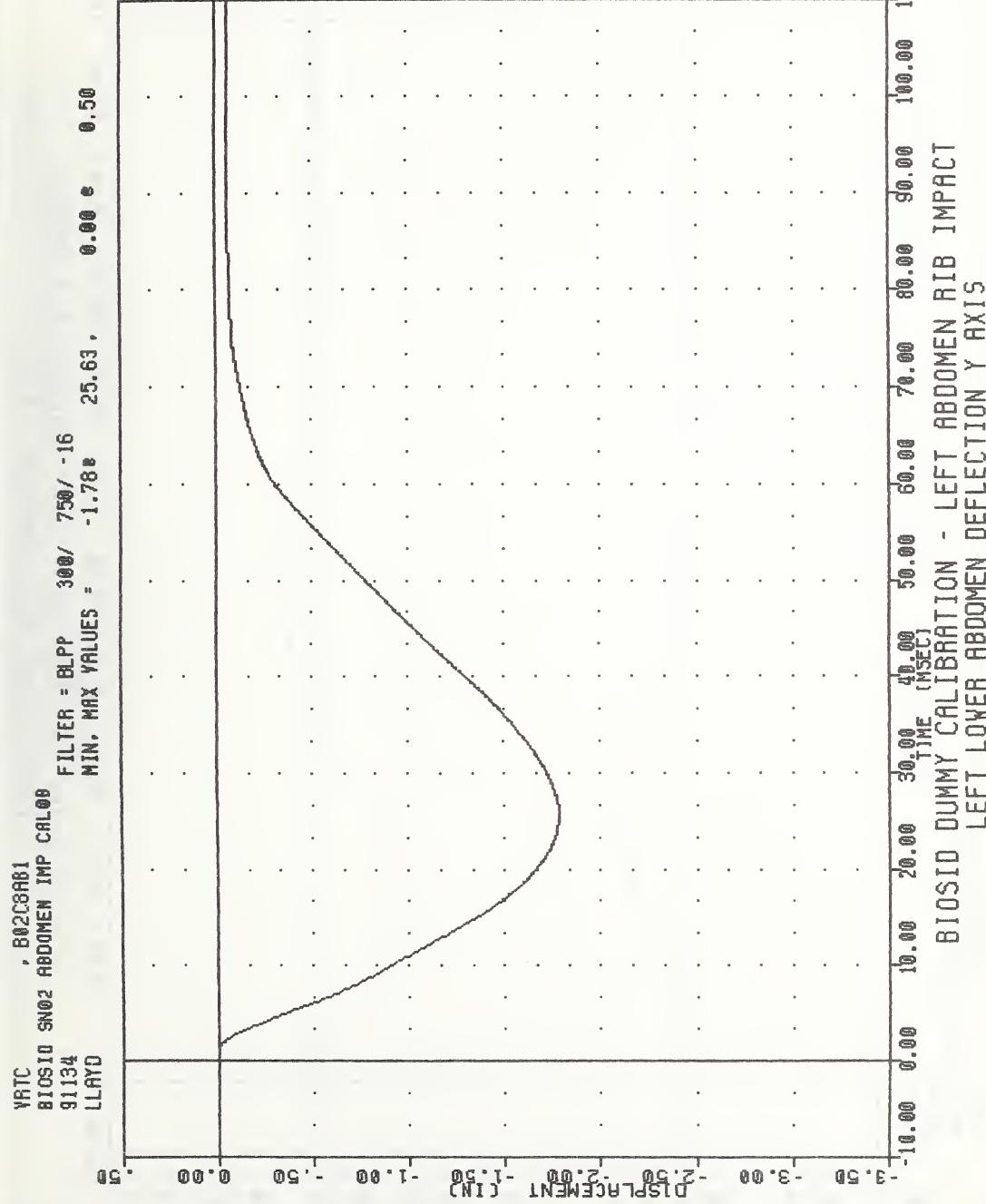
WRTC B02C8AB1
BIOSID SN002 ABDOMEN IMP CAL08
91134 LLAYG

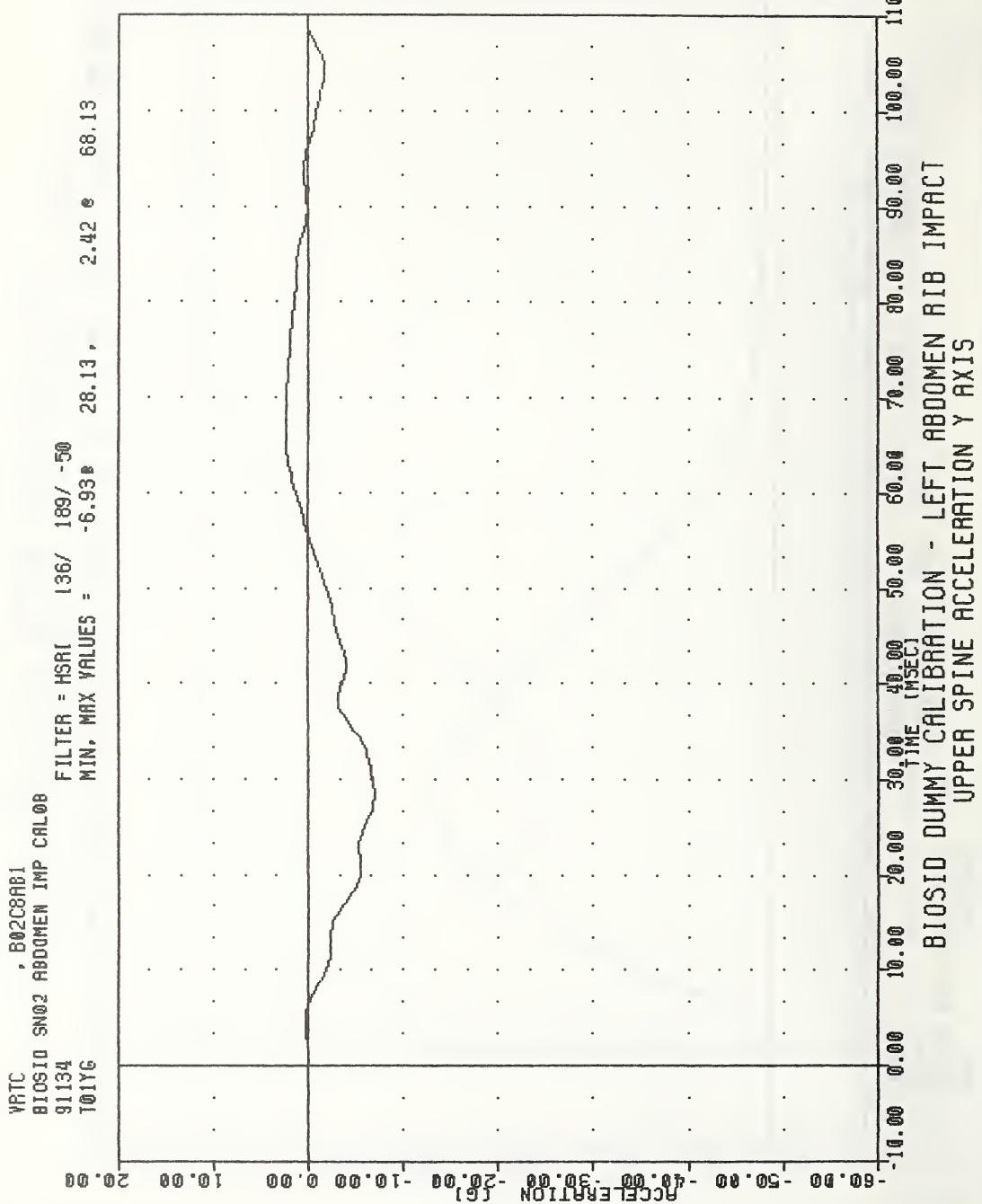
FILTER = HSRI
MIN, MAX VALUES = 136/ -189/ -500
2.50 , 21.45 e 8.13



DISPLACEMENT

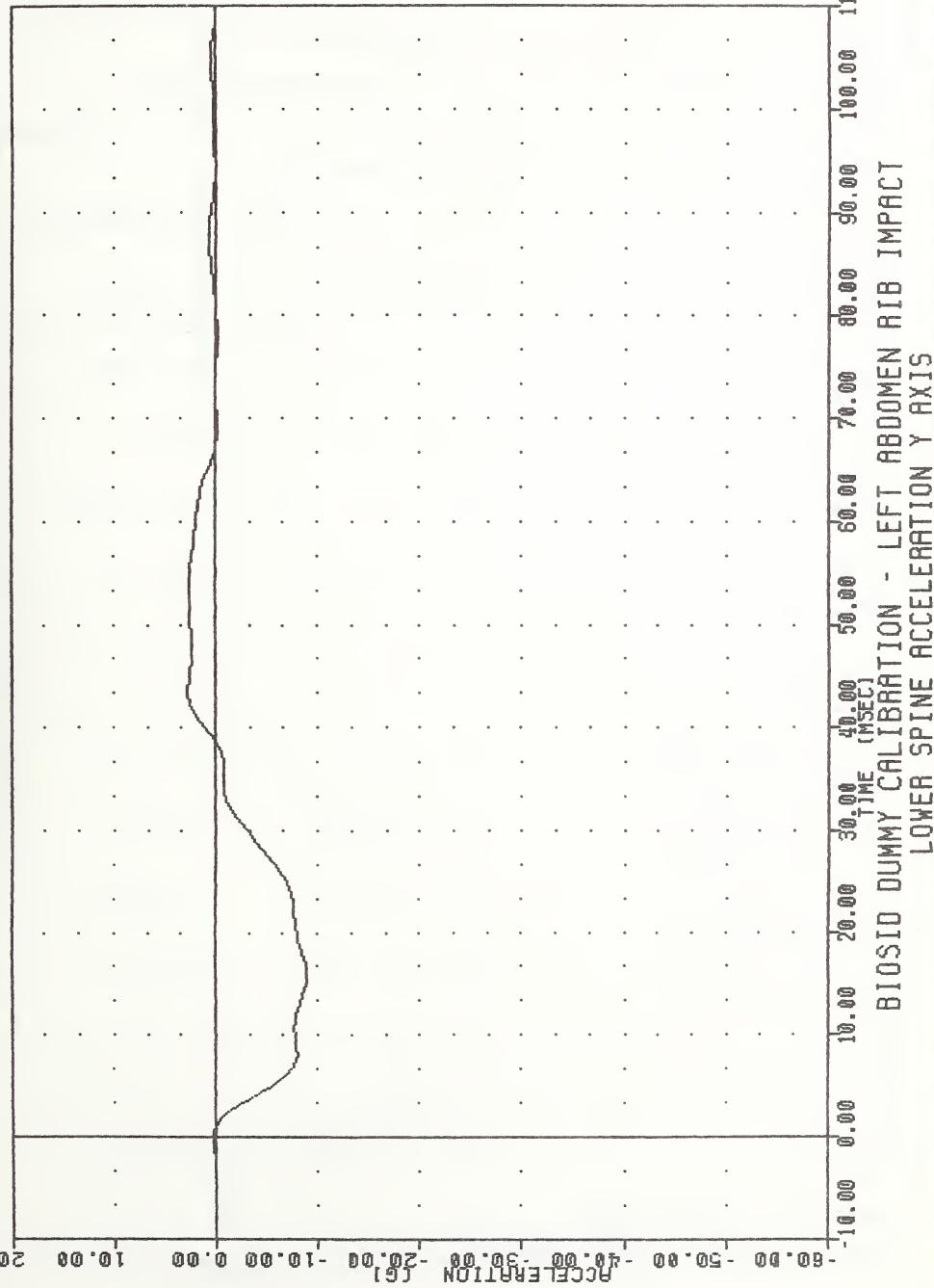






WRTC B02C8AB1
BIOSID SN002 ABDOMEN IMP CAL08
91134
112Y6

MIN, MAX VALUES = -9.000 15.63 , 2.67 & 43.75



TRANSPORTATION RESEARCH CENTER OF OHIO

THORAX IMPACT WITH ARMS - LINEAR IMPACTOR TEST

BIOSID DUMMY

15-May-91

LEFT SIDE CONFIGURATION

VRTC B02C8TA1 BIOSID SN02 THORAX-ARM CAL08

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
ITEMPERATURE	69 - 72 DEG. F	71.00 DEG. F
IRELATIVE HUMIDITY	10% - 70%	55.00 %
IPENDULUM VELOCITY	21.56 - 22.44 FT/SI	21.77 FT/SEC
IMIMPACTOR FORCE	1394 - 1709 LB	-1552. LB
IPEAK ACCELERATION IUPPER THORACIC RIB	55 - 80 G	-73.0 G
IPEAK ACCELERATION IMID THORACIC RIB	70 - 100 G	-83.4 G
IPEAK ACCELERATION ILOWER THORACIC RIB	85 - 128 G	-109.1 G
IPEAK DISPLACEMENT IUPPER THORACIC RIB	0.83 - 1.14 IN	-0.99 IN
IPEAK DISPLACEMENT IMID THORACIC RIB	1.26 - 1.65 IN	-1.52 IN
IPEAK DISPLACEMENT ILOWER THORACIC RIB	1.65 - 2.09 IN	-1.84 IN
IPEAK ACCELERATION IUPPER SPINE	34 - 43 G	-37.8 G
IPEAK ACCELERATION ILOWER SPINE	14 - 21 G	-15.4 G
IPEAK DISPLACEMENT ISHOULDER	0.59 - 1.06 IN	-0.83 IN

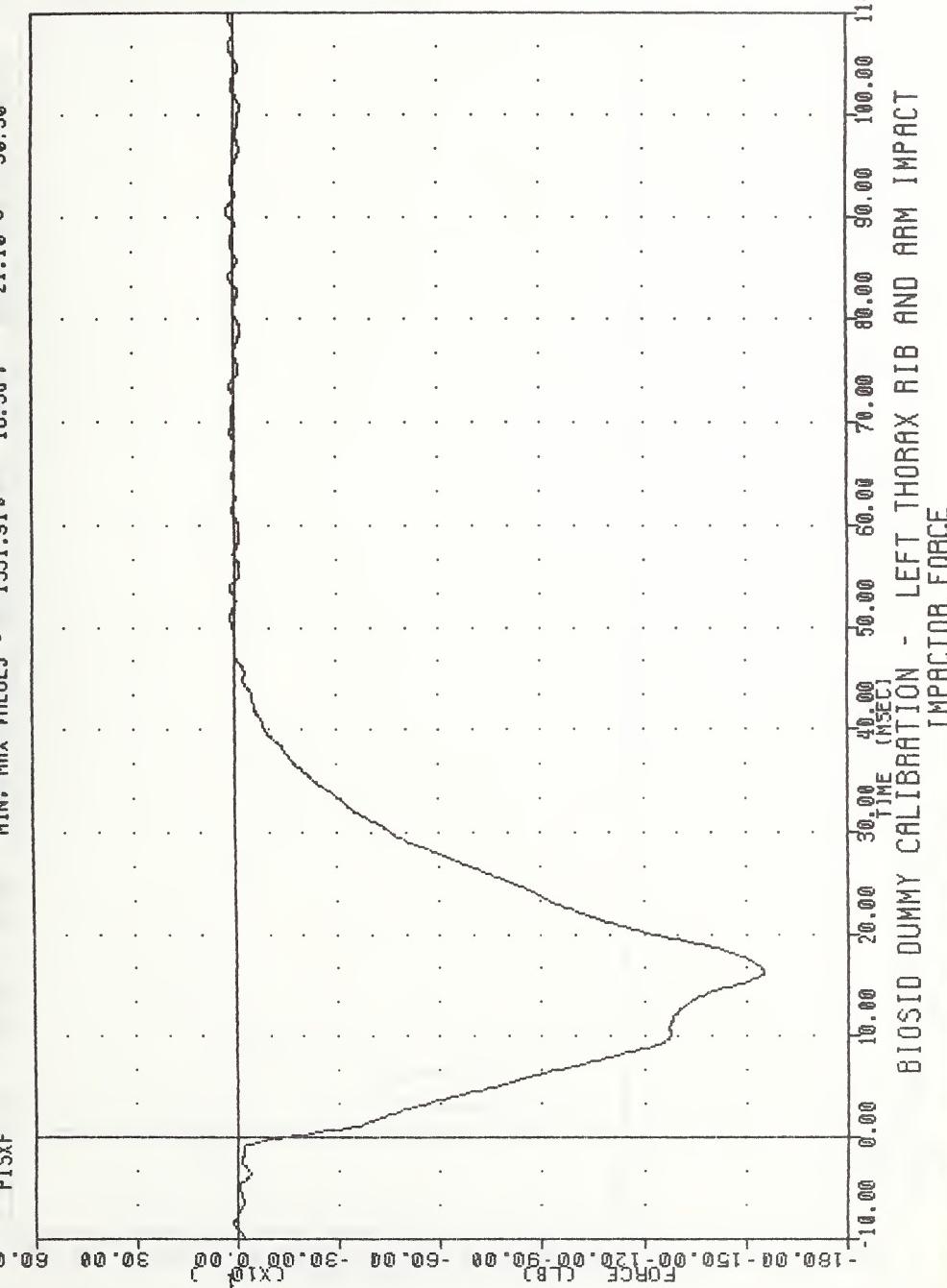
TEST MEETS SPECIFICATIONS

TECHNICIAN Chas. Middleb

VRTC B02C8TA1
BIOSID SN002 THORAX-ARM CAL00
91135

P15xF

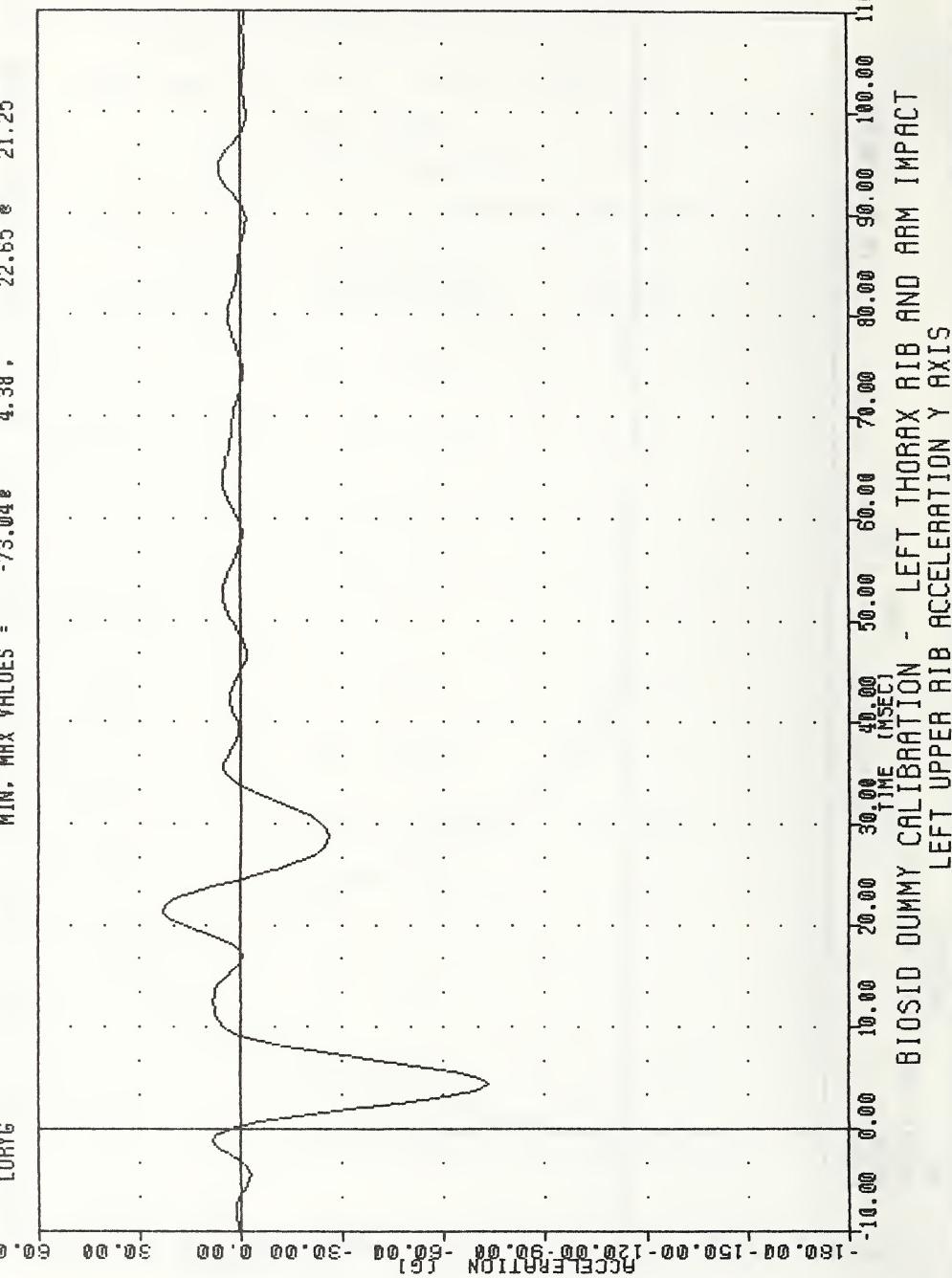
FILTER = BLPP 300/ 750/ -16
MIN. MAX VALUES = -1551.91+ 16.38+
21.10+ 90.50+



VRTC
BIOSID SN02 THORAX-ARM CAL08
91135
LURY6

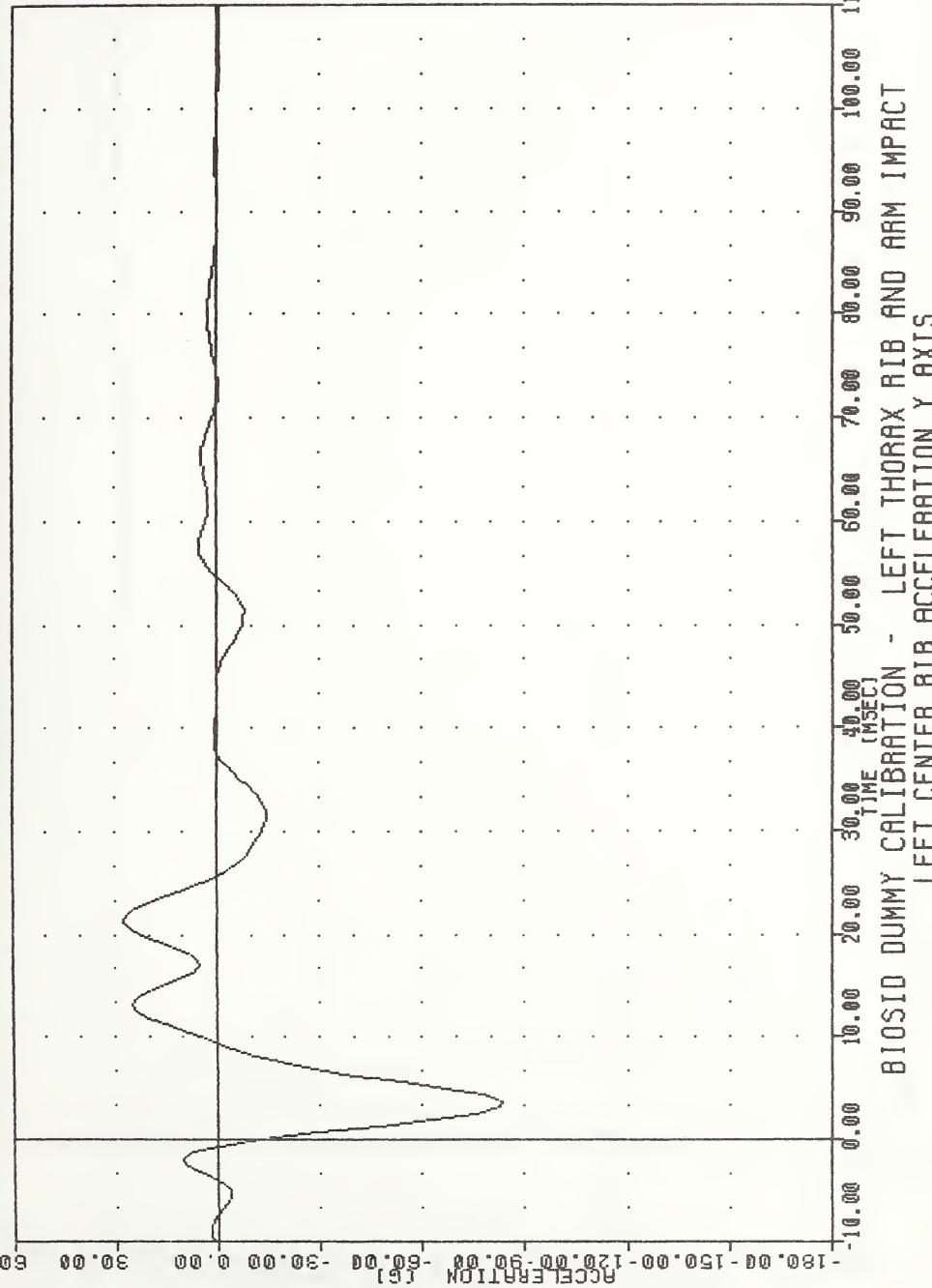
MIN. MAX VALUES = -73.048 4.38 ,
FILTER = HSRI 136/ 189/ -50

22.65 & 21.25



YRTC
BIOSID SN#02 THORAX-ARM CAL#8
91135
LCRY6

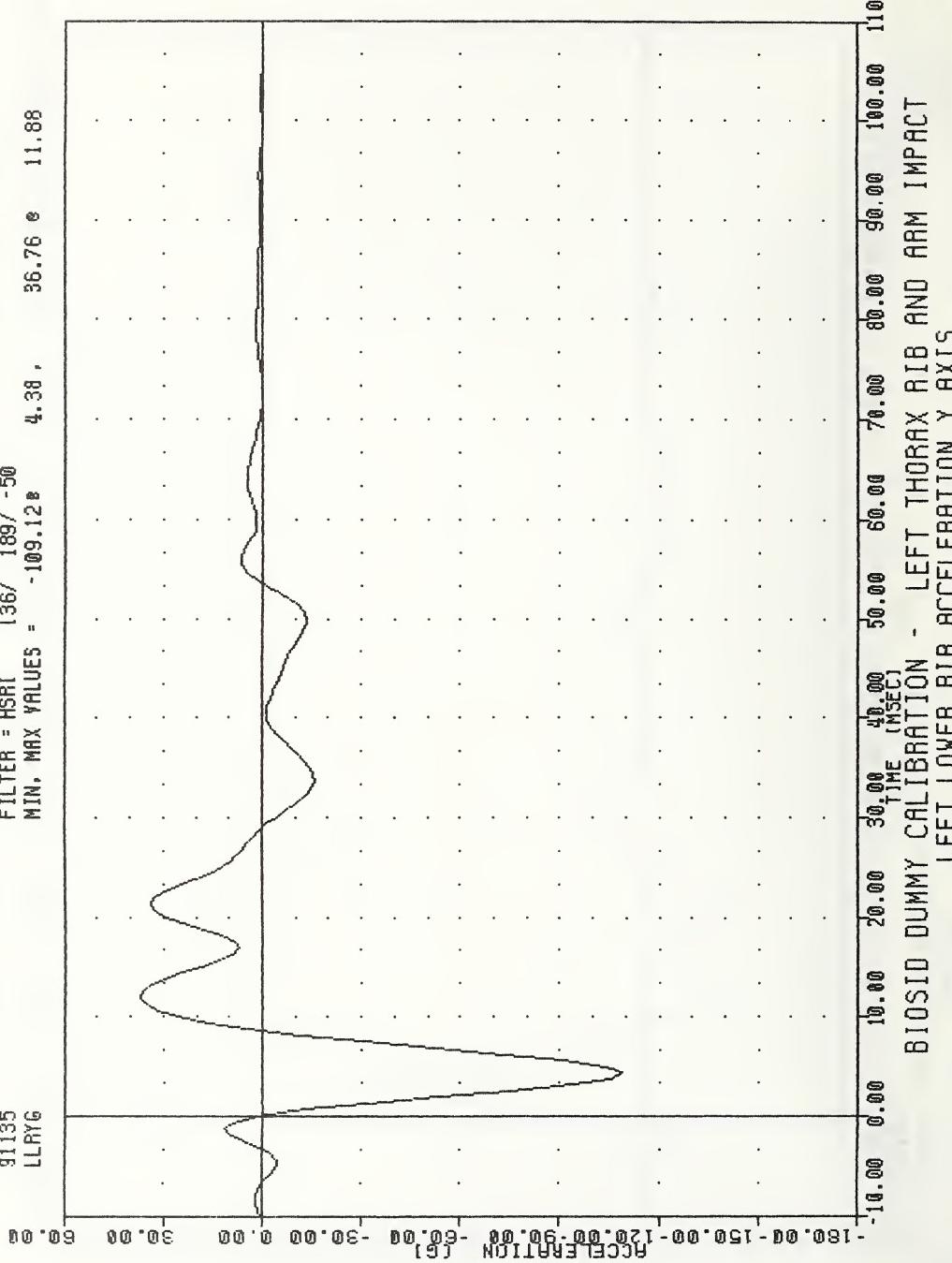
MIN, MAX VALUES = -83.388 3.75 , 136/ 189/ -50



BIOSID DUMMY CALIBRATION - LEFT THORAX RIB AND ARM IMPACT
LEFT CENTER RIB ACCELERATION Y AXIS

VRTC
BIOSID SN02 THORAX-ARM CAL09
91135
LLRYG

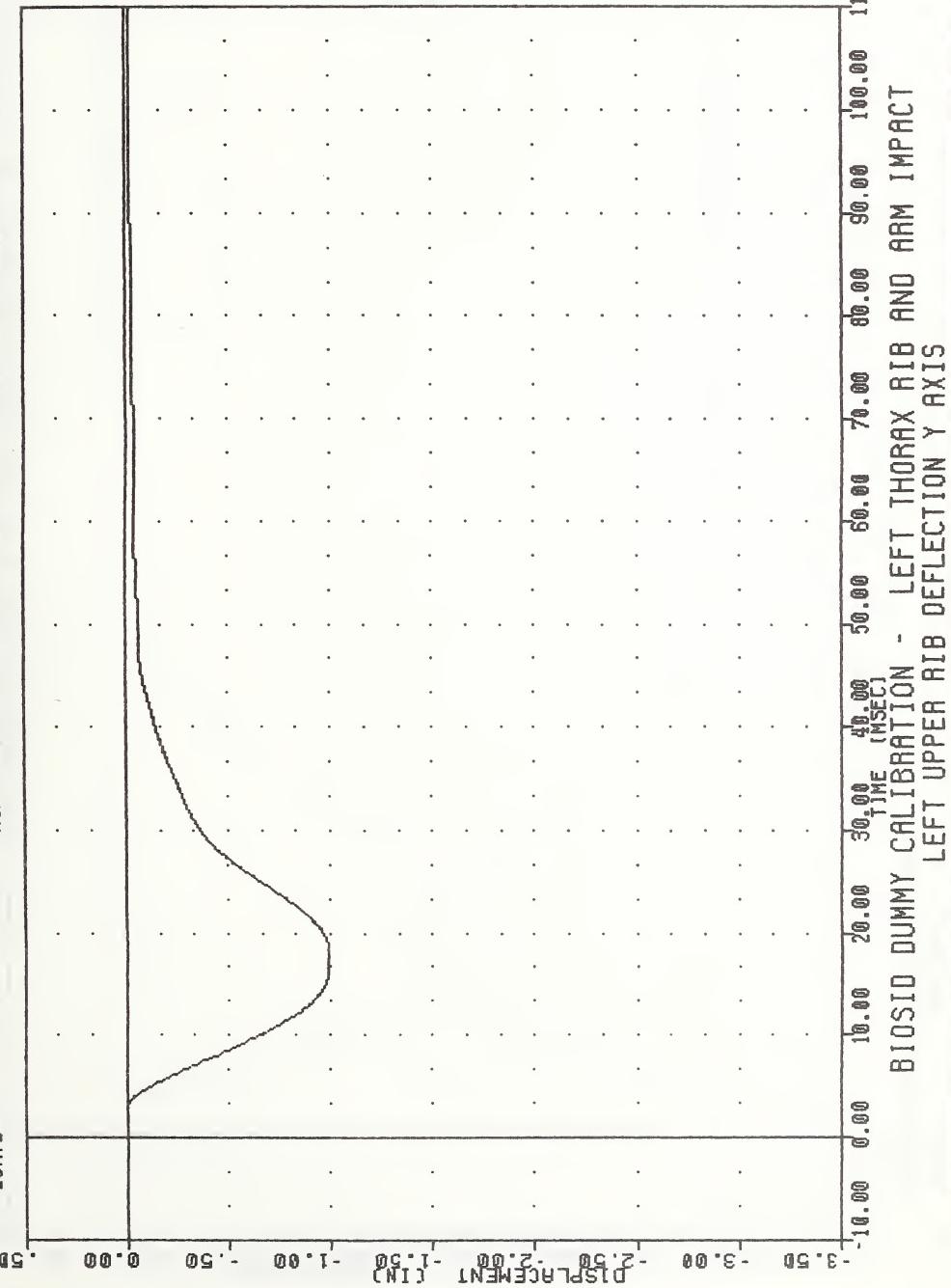
BW2C8TA1
FILTER = HSRL 136/ 189/ -50
MIN, MAX VALUES = -109.128 , 4.38 ,
36.76 & 11.88



BIOSID DUMMY CALIBRATION - LEFT THORAX RIB AND ARM IMPACT
LEFT LOWER RIB ACCELERATION Y AXIS

WRTC
BIOSID SN#2 THORAX-ARM CAL08
91135 LURYD

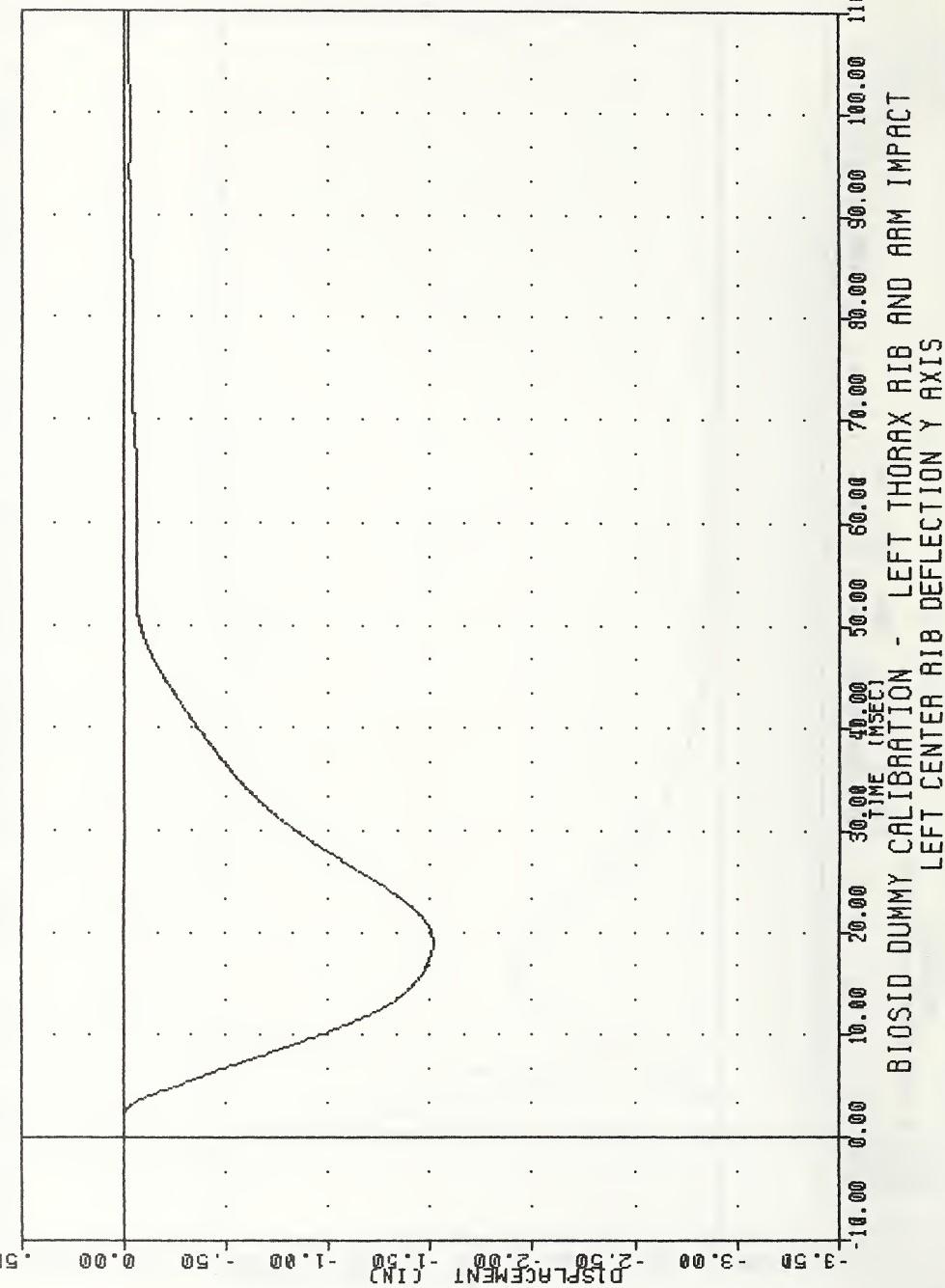
B02C8TR1
FILTER = BIIPP 3000/ 750/-16
MIN, MAX VALUES = -0.998 17.50 ,
0.00 e 2.25



VRTC
BIOSSID SNO02 THORAX-ARM CAL08
91135 LCRYD

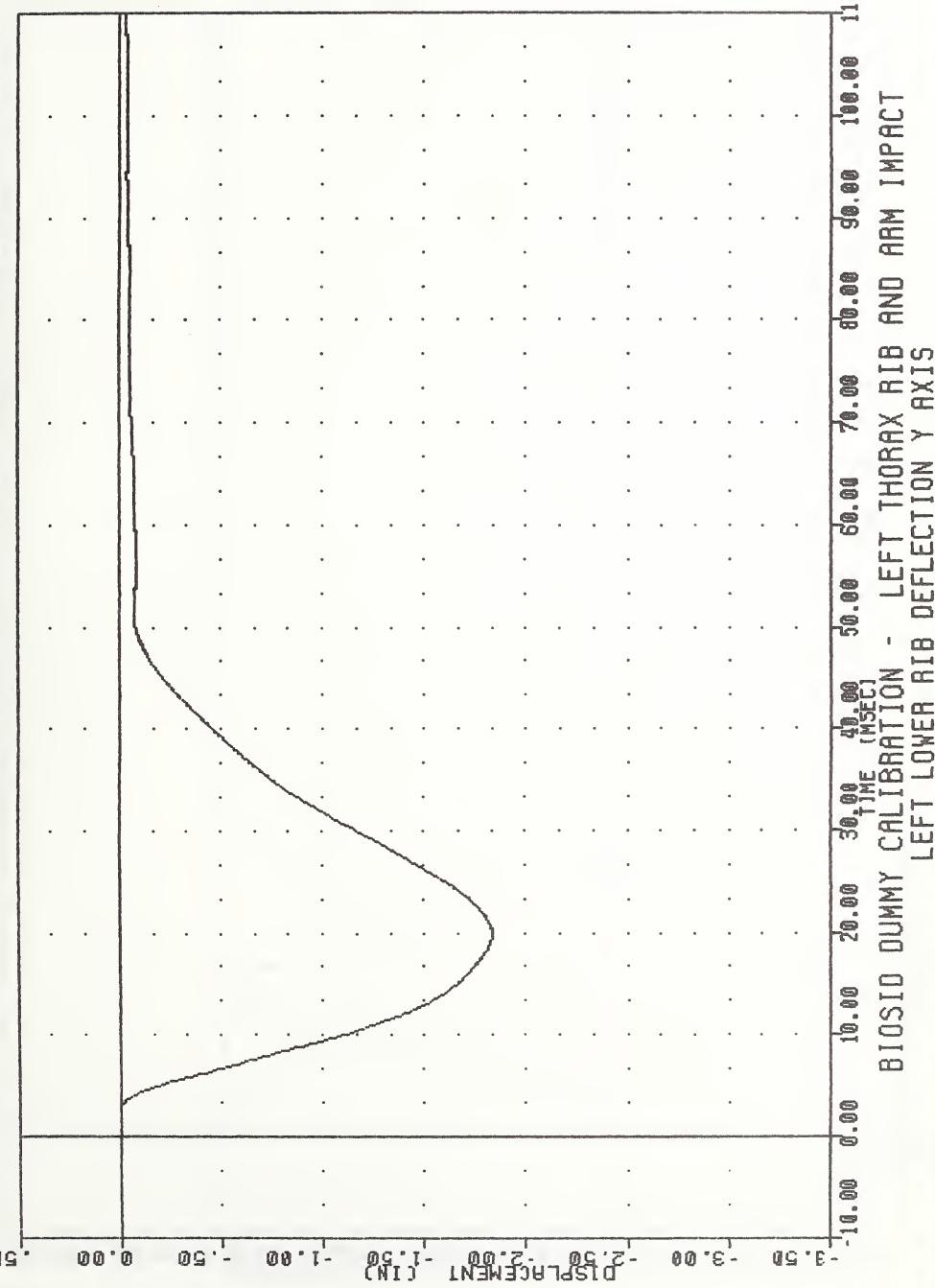
FILTER = BLPP 300/ 750/-16
MIN. MAX VALUES = -1.528 18.88 .

0.00 .50



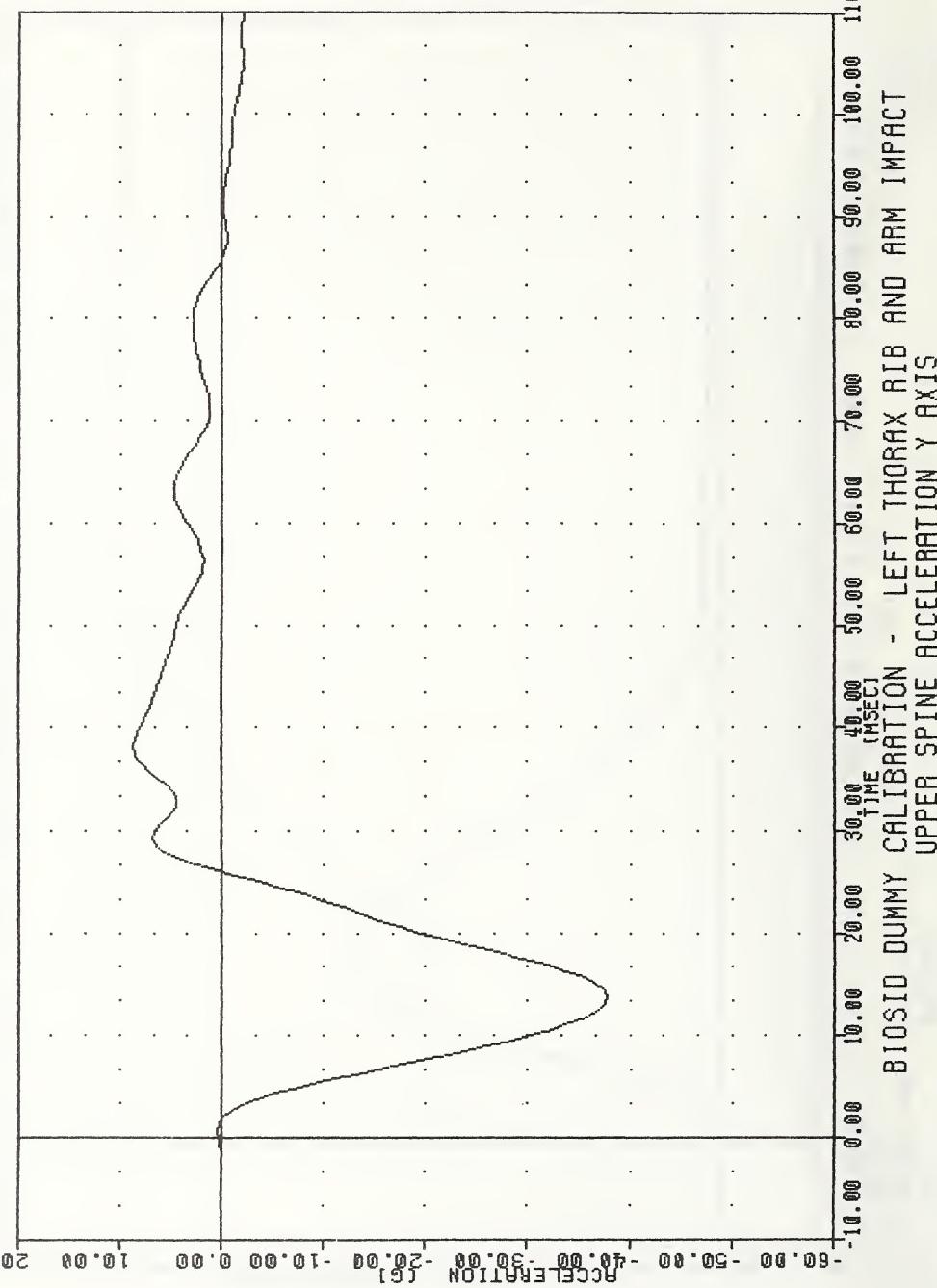
YRTC
B0208TA1
BIOSID SNO2 THORAX-ARM CAL08
91135
LLRYD

FILTER : BLPP 300/
MIN, MAX VALUES = -1.848 19.88 ,
0.00 & 2.13



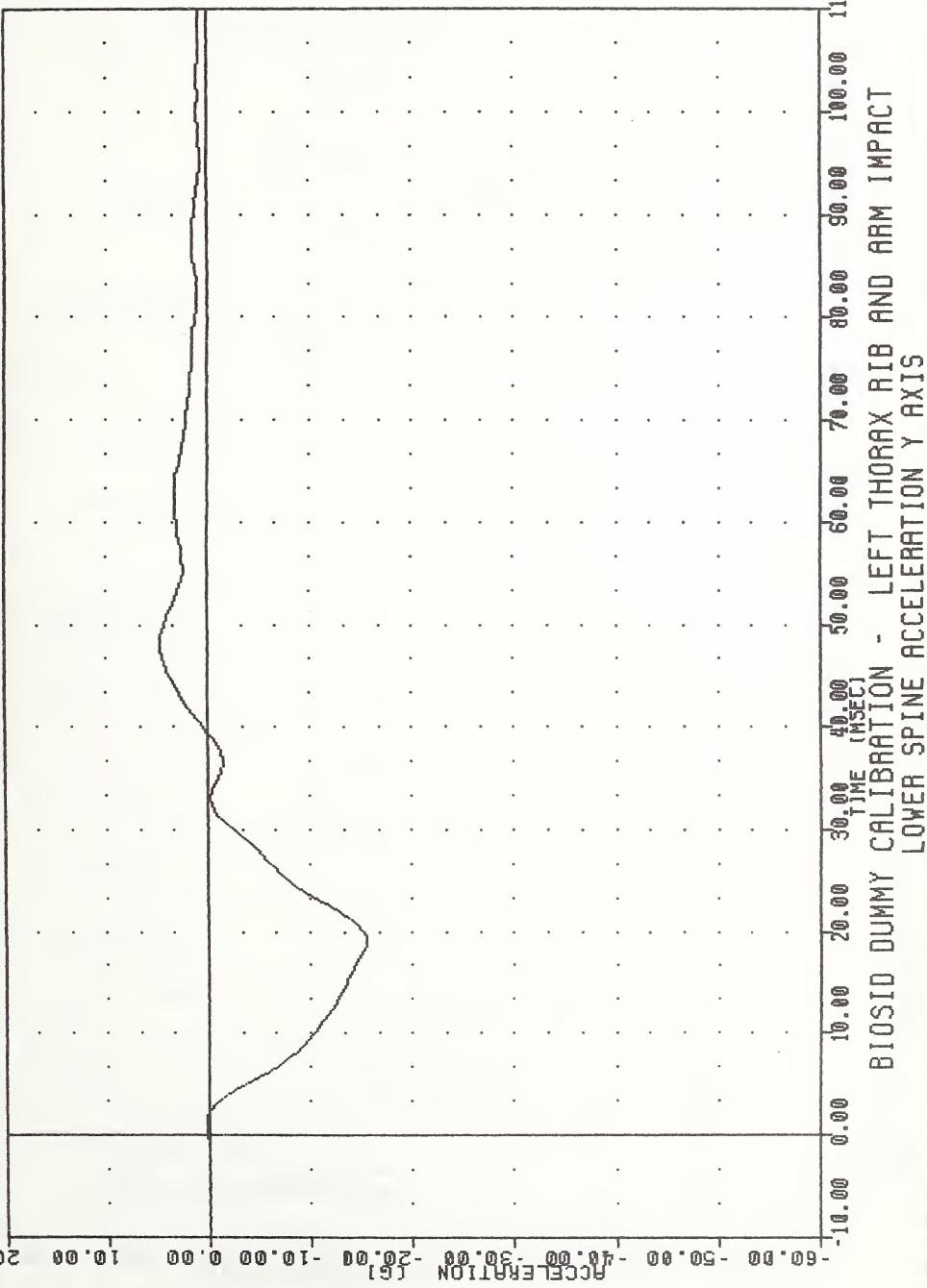
YRTC B02C8TH1
BIOSID SN@2 THORAX-ARM CAL@0
91135
T01Y6

FILTER = HSRI 136/ -50
MIN. MAX VALUES = -37.83@ 13.75 , 8.61 @ 38.13



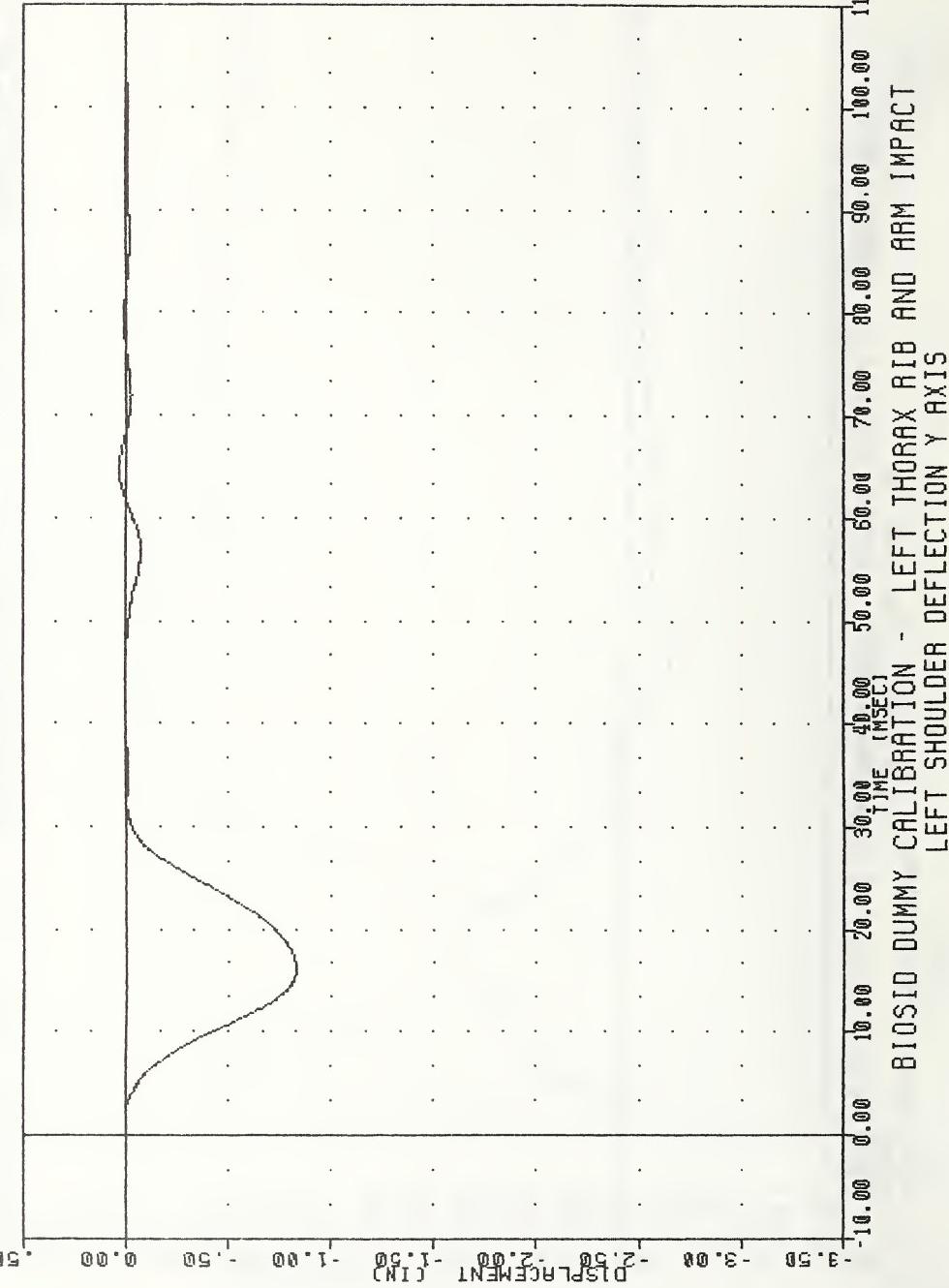
YRTC BIOSID SN#02 THORAX-ARM CAL00
91135 11216

FILTER = HSRI 136/ 189/ -50
MIN, MAX VALUES = -15.430 19.38 . 4.67 e 48.13



VRTC
BIOSID SN002 THORAX-ARM CAL06
91135
SHLYD

FILTER = BLPP 3000/ 7500 / -16
MIN. MAX VALUES = -0.838 16.00 ,
0.03 & 64.63



TRANSPORTATION RESEARCH CENTER OF OHIO
 THORAX IMPACT WITHOUT ARMS - LINEAR IMPACTOR TEST

BIOSID DUMMY

14-May-91

LEFT SIDE CONFIGURATION

VRTC B02CBTR2 BIOSID SN02 THORAX-RIB CAL08

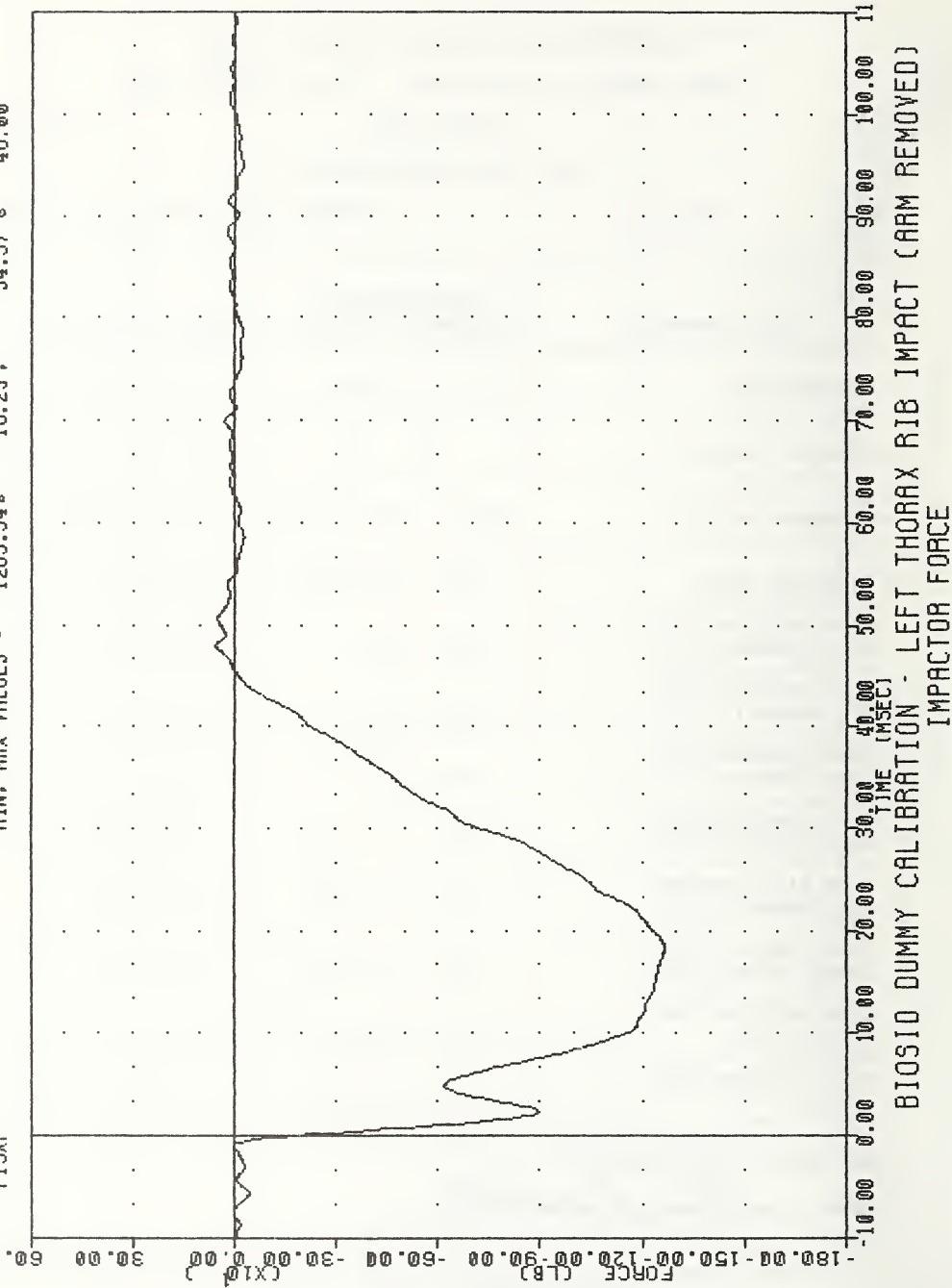
TEST PARAMETER	SPECIFICATION	TEST RESULTS
	(ABSOLUTE VALUE)	
ITEMPERATURE	69 - 72 DEG. F	72.00 DEG. F
IRELATIVE HUMIDITY	10% - 70%	57.00 %
IPENDULUM VELOCITY	21.56 - 22.44 FT/SI	21.92 FT/SEC
IIMPACTOR FORCE	1169 - 1416 LBS	-1266. LB
IPeAK ACCELERATION IUPPER THORACIC RIB	133 - 179 G	-165.7 G
IPeAK ACCELERATION IMID THORACIC RIB	133 - 179 G	-161.0 G
IPeAK ACCELERATION ILOWER THORACIC RIB	133 - 179 G	-176.2 G
IPeAK DISPLACEMENT IUPPER THORACIC RIB	1.97 - 2.76 IN	-2.25 IN
IPeAK DISPLACEMENT IMID THORACIC RIB	1.97 - 2.76 IN	-2.51 IN
IPeAK DISPLACEMENT ILOWER THORACIC RIB	1.97 - 2.76 IN	-2.47 IN
IPeAK ACCELERATION IUPPER SPINE	19.5 - 24.5 G	-19.5 G
IPeAK ACCELERATION ILOWER SPINE	12.0 - 16.5 G	-14.3 G

TEST MEETS SPECIFICATIONS

TECHNICIAN Chris Middlekauf

YRTC
BIOSID SN#2 THORAX-RIB CAL#8
91134
PISMF

B022C8TR2
FILTER = BLPP 300/ 750/-16
MIN. MAX VALUES = -1265.548 18.25+
54.37@ 48.000



BIOSID DUMMY CALIBRATION - LEFT THORAX RIB IMPACT (ARM REMOVED)
IMPACTOR FORCE

VRTC
BIOSID
91134
LURIG

B02C8TR2
SN02 THORAX-RIB CAL08

60.00

1.88

65.94

6.88

185.

10.00

20.00

30.00

40.00

50.00

60.00

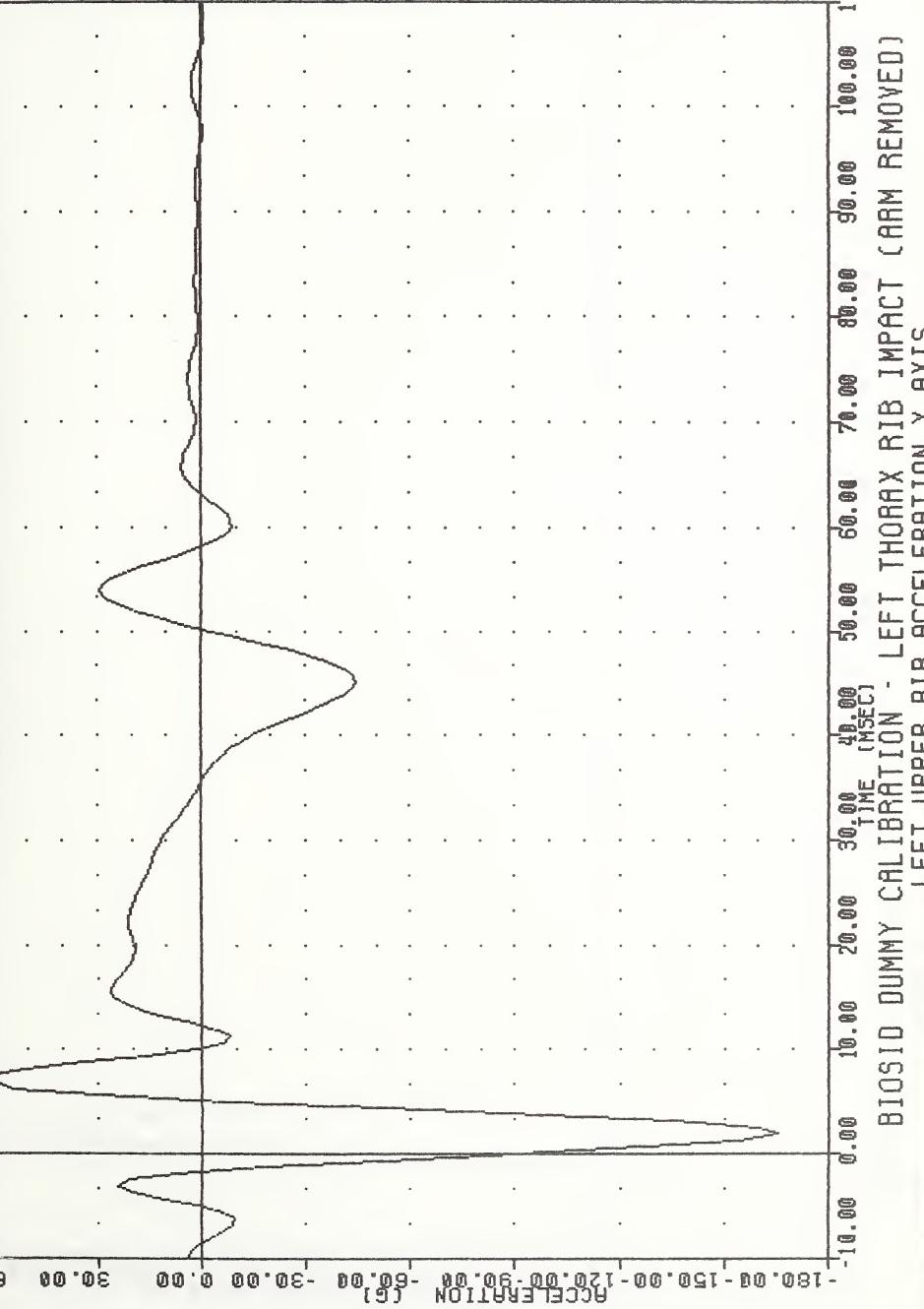
70.00

80.00

90.00

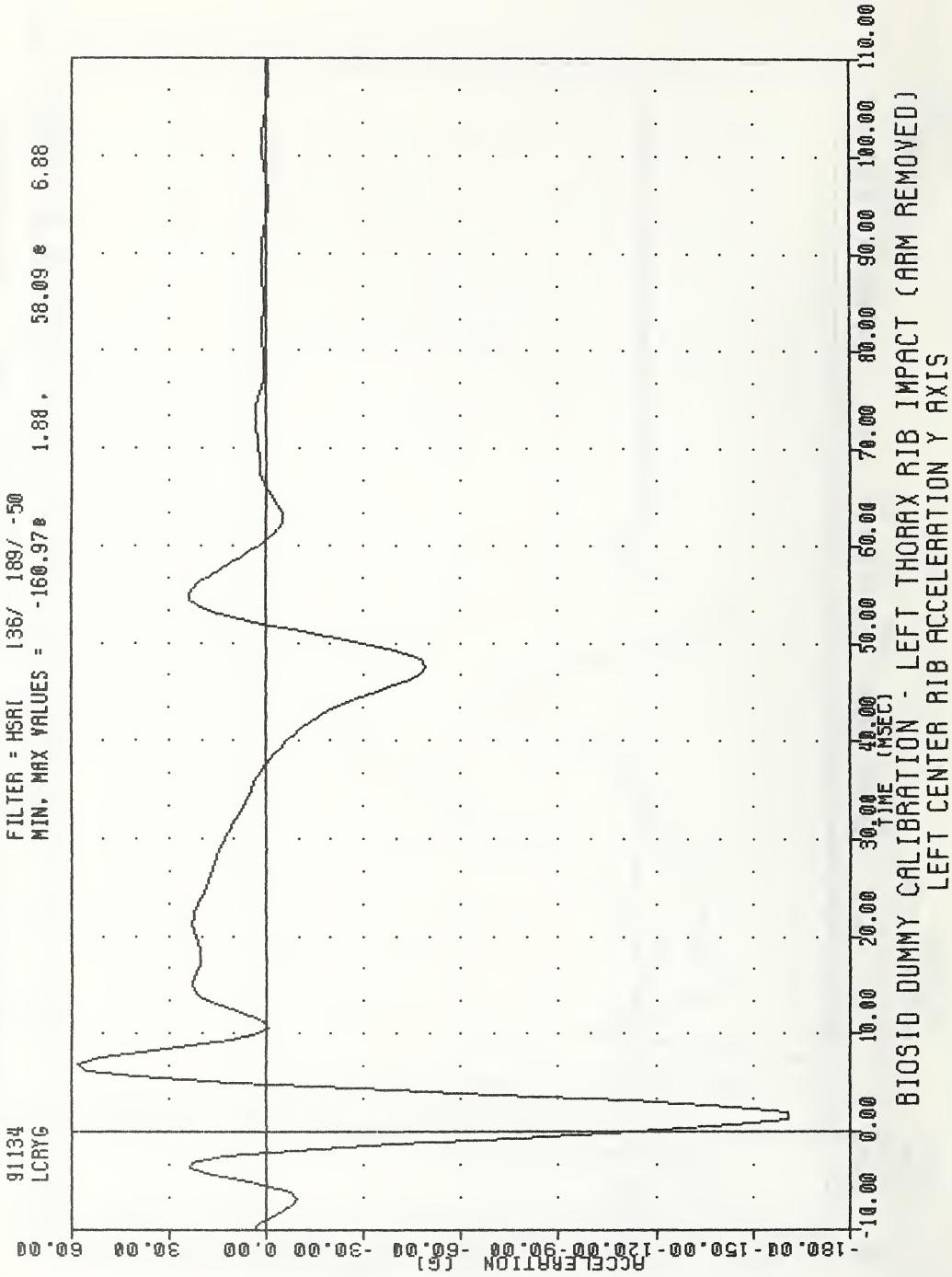
100.00

110.00



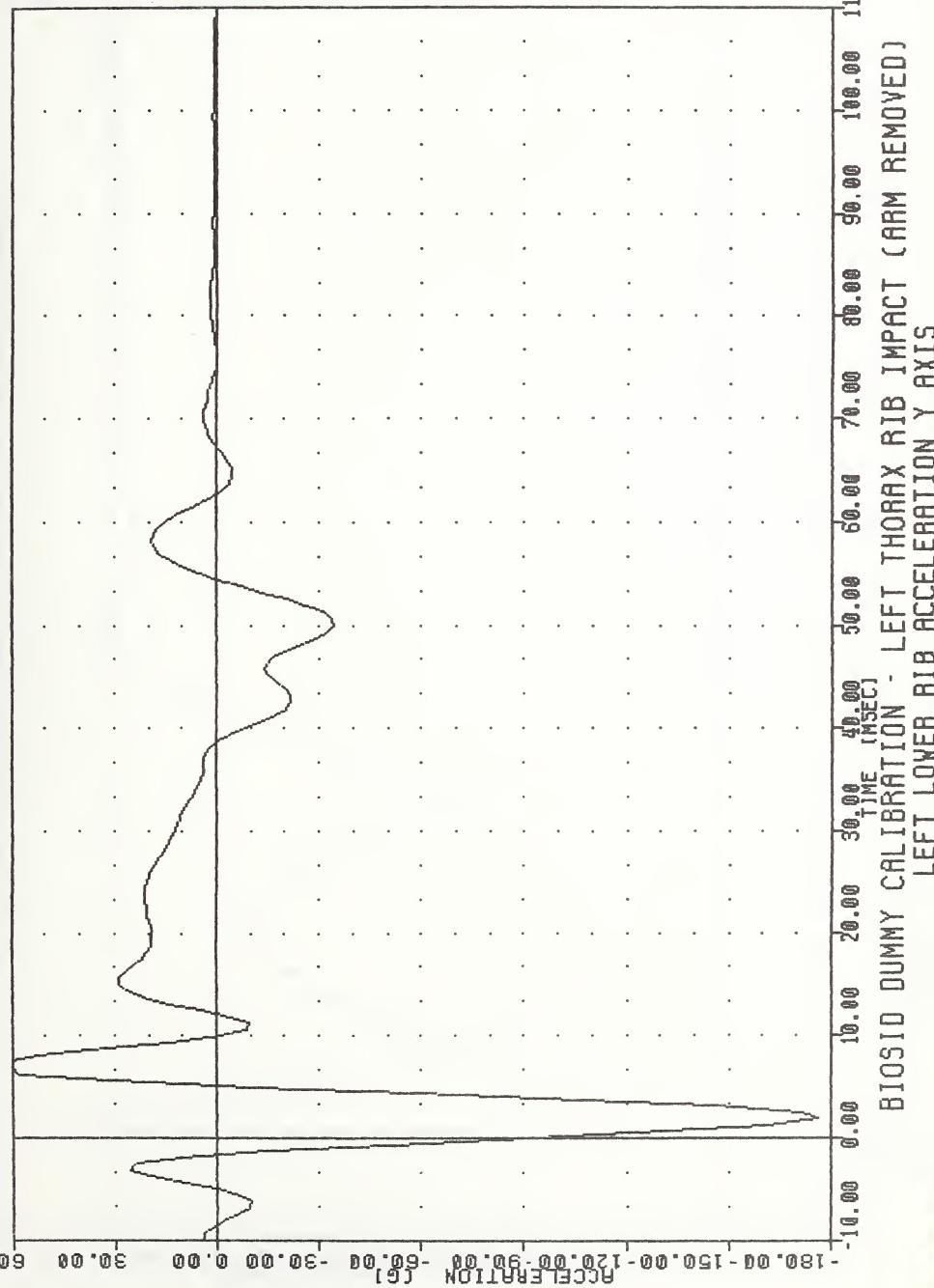
VRTC B02C8TR2
BIOSID SN02 THORAX-RIB CAR 08
91134
LCRY6

MIN, MAX VALUES = -160.978 1.88 ,
58.09 & 6.88



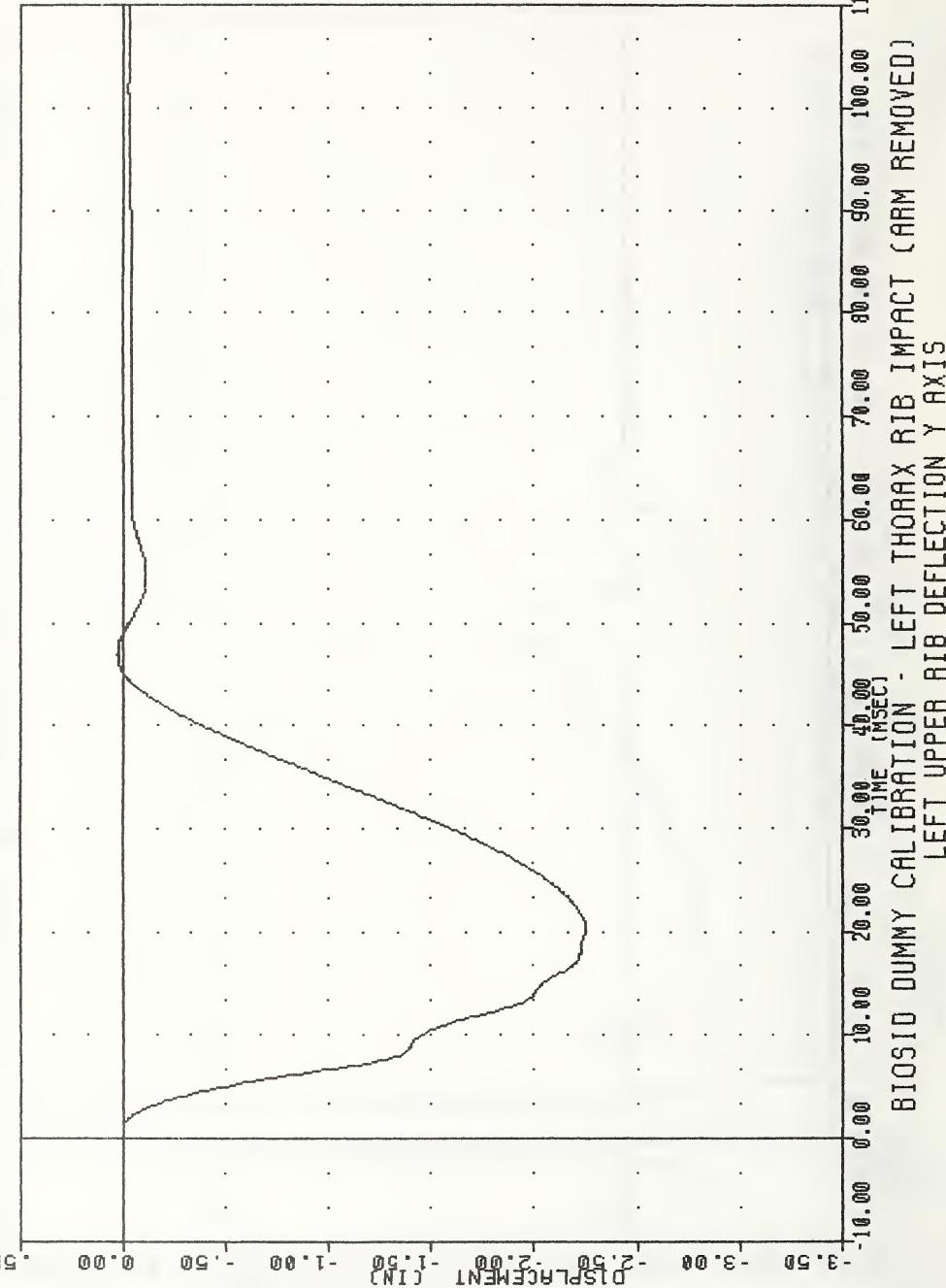
VRTC B02C8TR2
BIOSID SN02 THORAX-RIB CAL06
91134
LLRY6

FILTER = HSRI 136/ 189/-50
MIN., MAX VALUES = -176.16e 1.88 ,
69.50 e 6.88



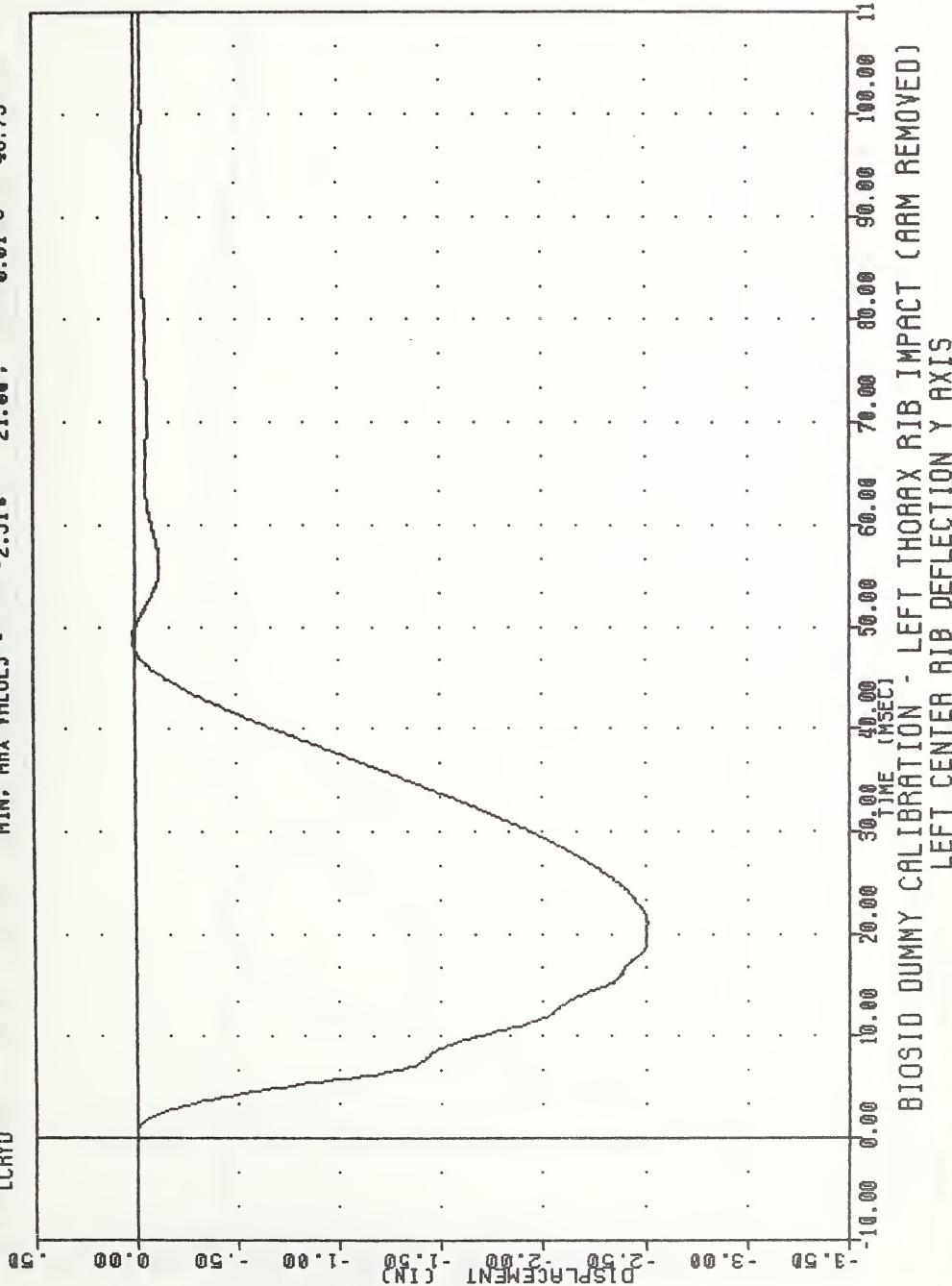
VRTC
BIOSID SN002 THORAX-RIB CAL08
91134 LURD

B02C8TR2
MIN. MAX VALUES = -2.250 , 20.38 , 0.02 & 47.00



VRTC BIOSID SN02 THORAX-RIB CAL06
91134 LCRID

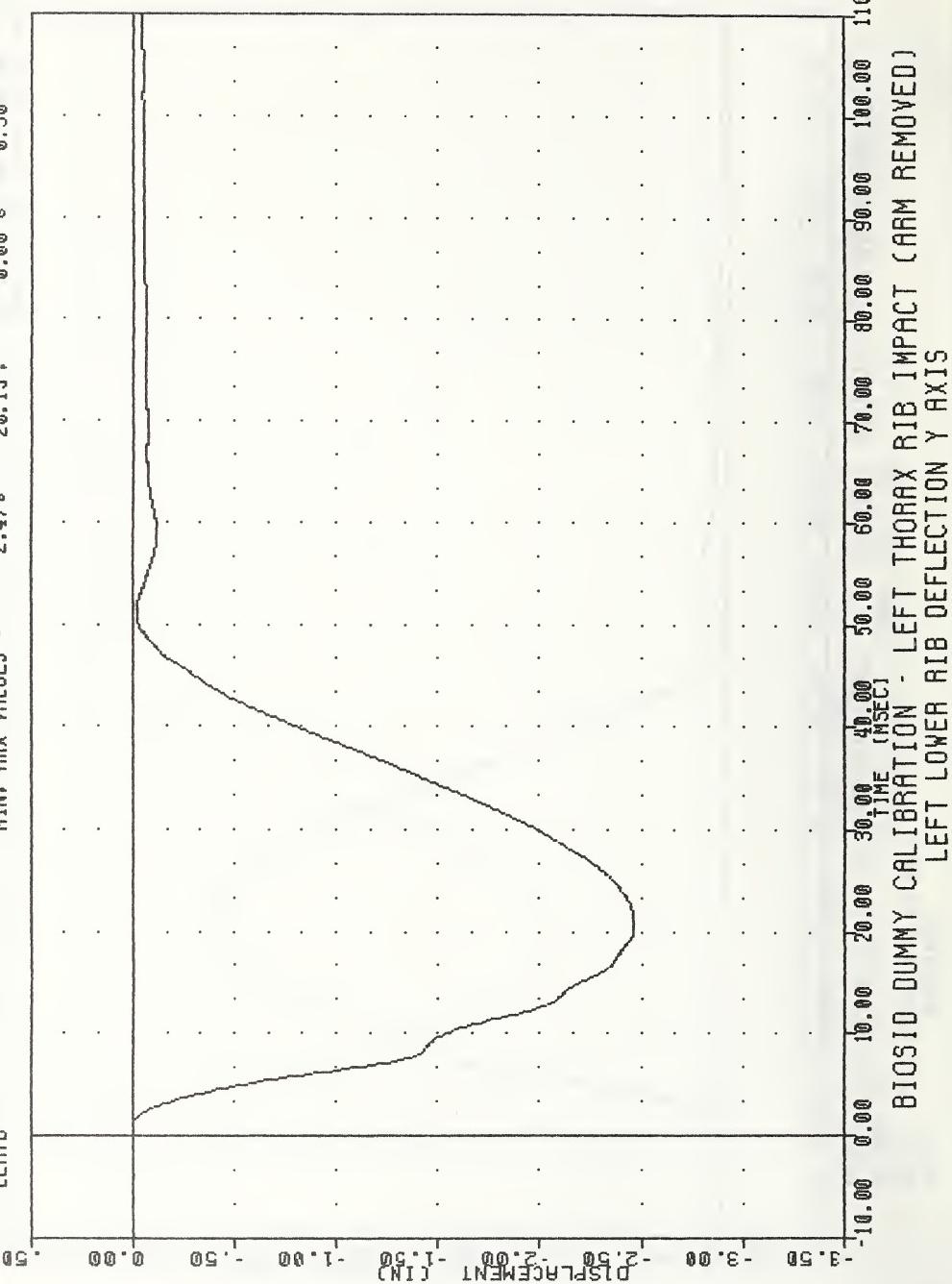
BIO2C8TR2
MIN. MAX VALUES = -2.51e -21.00 , 0.01 e 48.75



FILTER = BLPP 300/ 750/-16
LEFT THORAX RIB IMPACT (ARM REMOVED)
LEFT CENTER RIB DEFLECTION Y AXIS

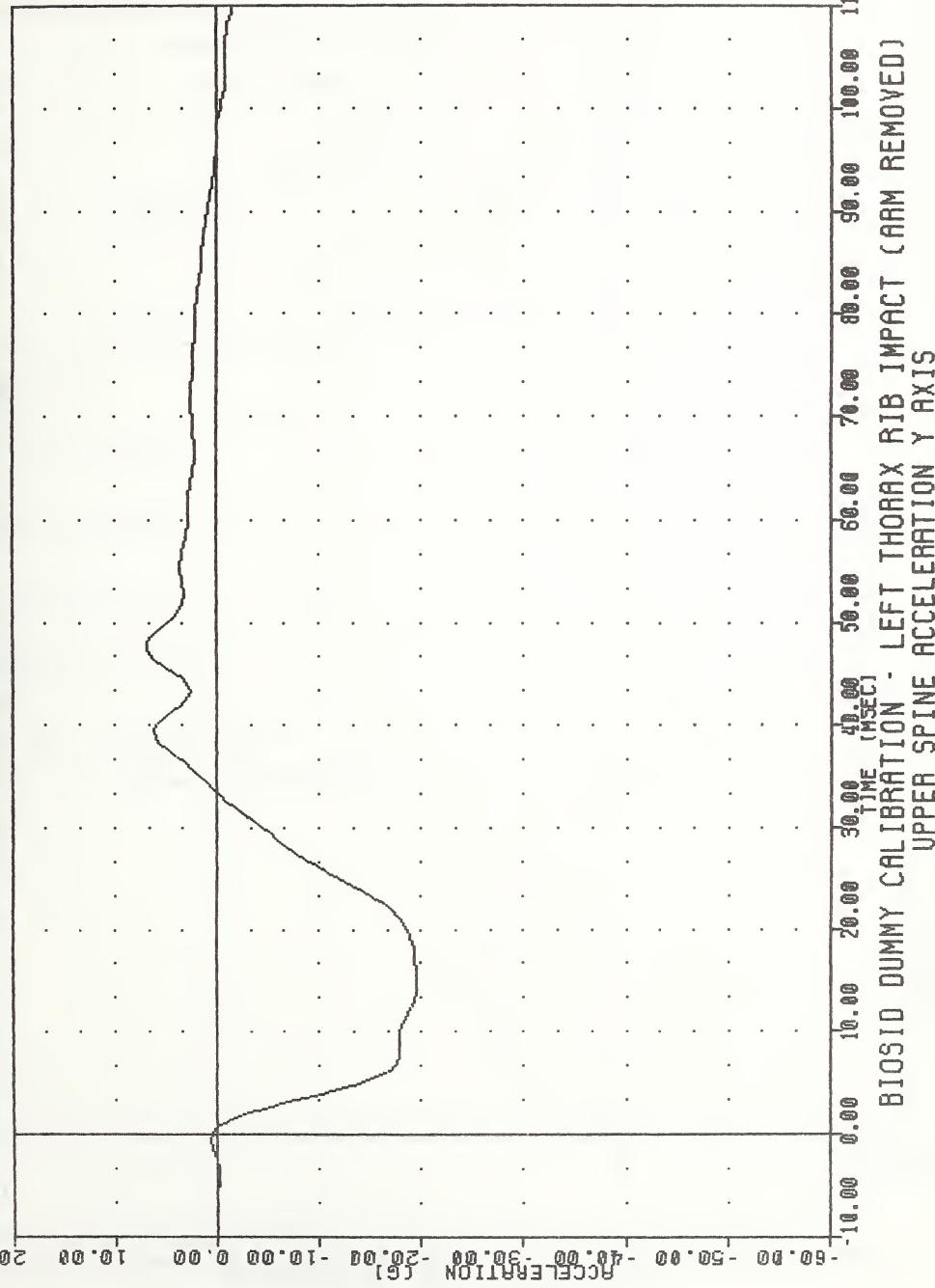
VRTC
BIOSID SN002 THORAX-RIB CAL00
91134
LLRYD

FILTER = BLPP 300/ 750/-16
MIN, MAX VALUES = -2.478 20.13+



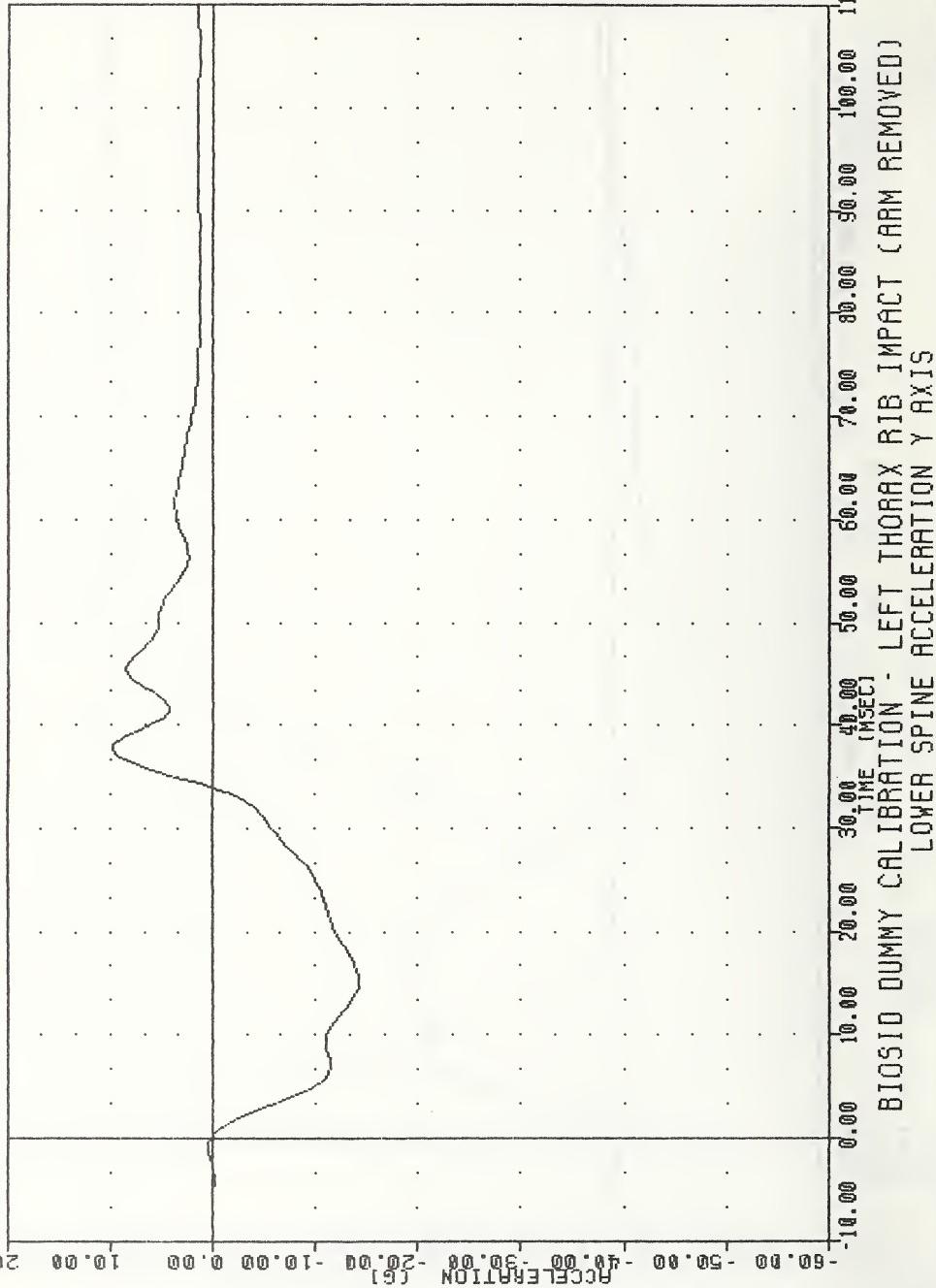
YRTC
BIOSID SN002 THORAX-RIB CAL00
91134 T01Y6

B02C8TR2
MIN. MAX VALUES = -19.53@ 15.00 .
6.88 @ 47.50



YRTC B02C8TR2
BIOSID SN02 THORAX-RIB CAL08
91134
11246

FILTER = HSRL 136/ 189/ -50
MIN. MAX VALUES = -14.298 15.000 ,
9.83 e 37.50



TRANSPORTATION RESEARCH CENTER OF OHIO

PELVIS IMPACT -- LINEAR IMPACTOR TEST

BIOSID DUMMY

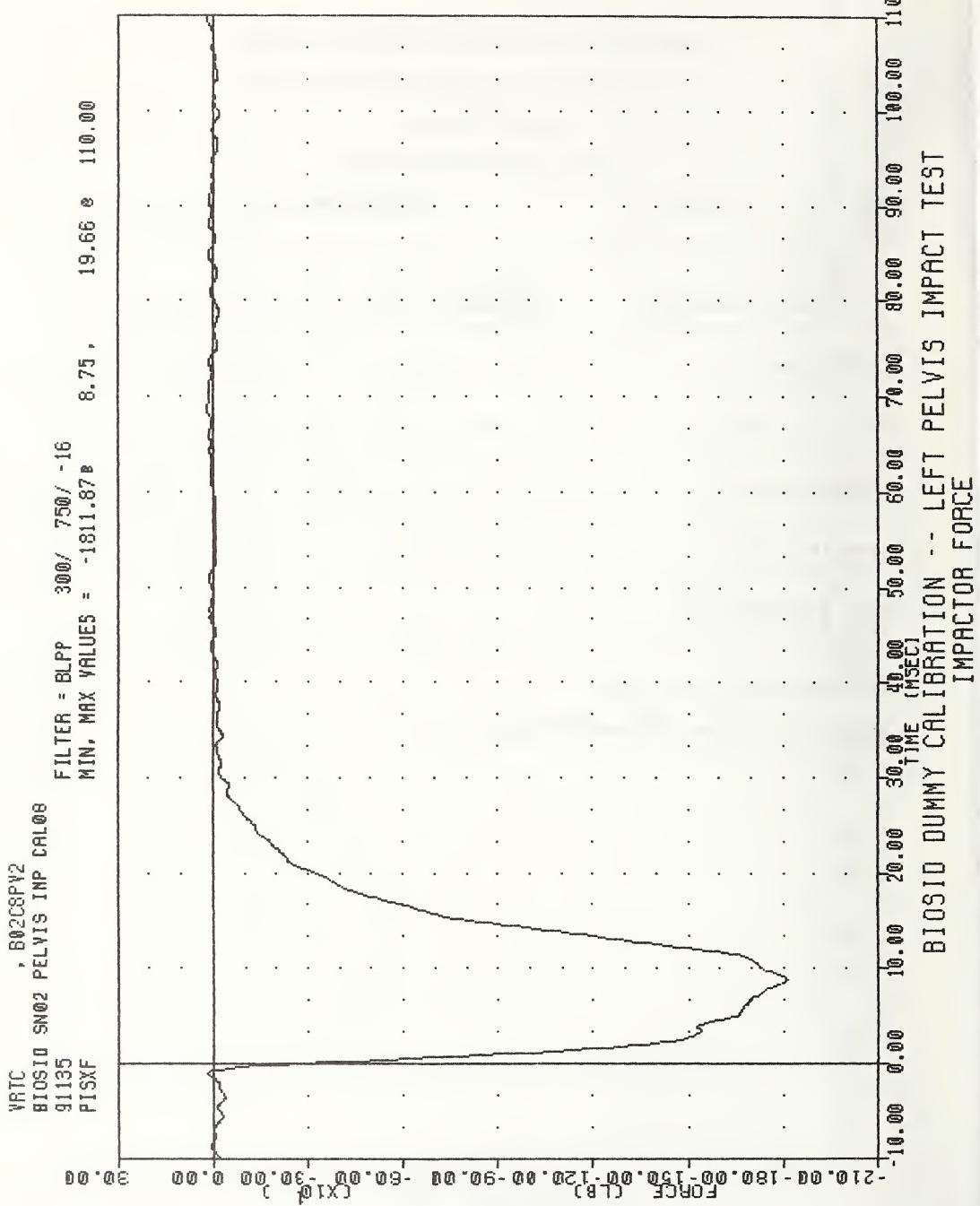
15-May-91

LEFT SIDE CONFIGURATION

VRTC	B02C8PV2	BIOSID SN02 PELVIS IMP CAL08	
TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS	
ITEMPERATURE	69 - 72 DEG. F	71.00	DEG. F
IRELATIVE HUMIDITY	10% - 70%	55.00	%
IPENDULUM VELOCITY	21.56 - 22.44 FT/SI	21.77	FT/SEC
IMPICTOR FORCE	1731 - 2181 LB	-1812.	LB
IPeAK ACCELERATION			
IPELVIS	42 - 66 G	-48.6	G

TEST MEETS SPECIFICATIONS

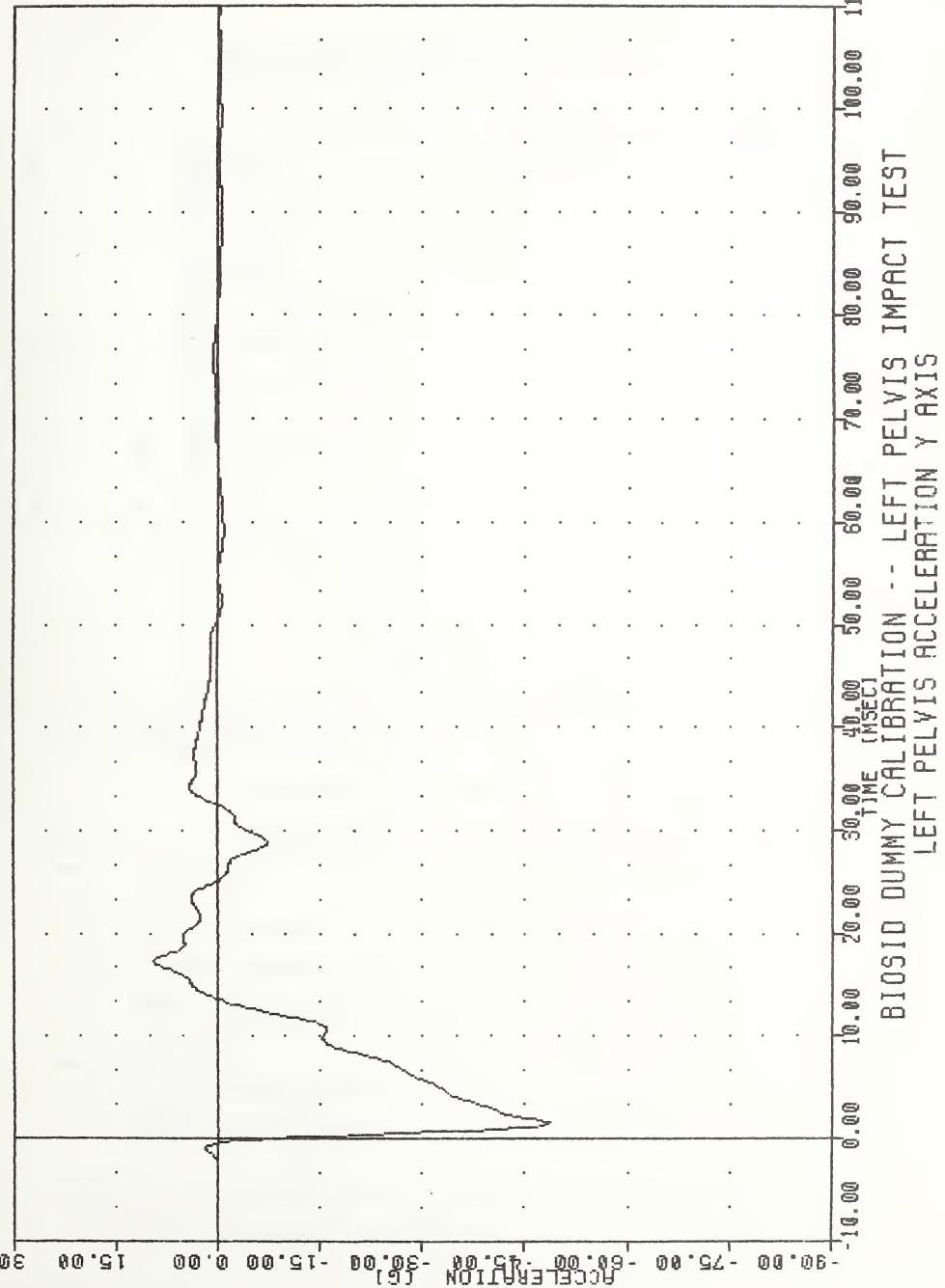
TECHNICIAN Chas. Middle t



VRTC
EN208PV2
BIOSID 3N002 PELVIS INF CAL08
91135
PEVYG

FILTER = BLPP / 300/
MIN. MAX VALUES = 750 / -16
-48.588

1.50 ,
9.37 &
17.25

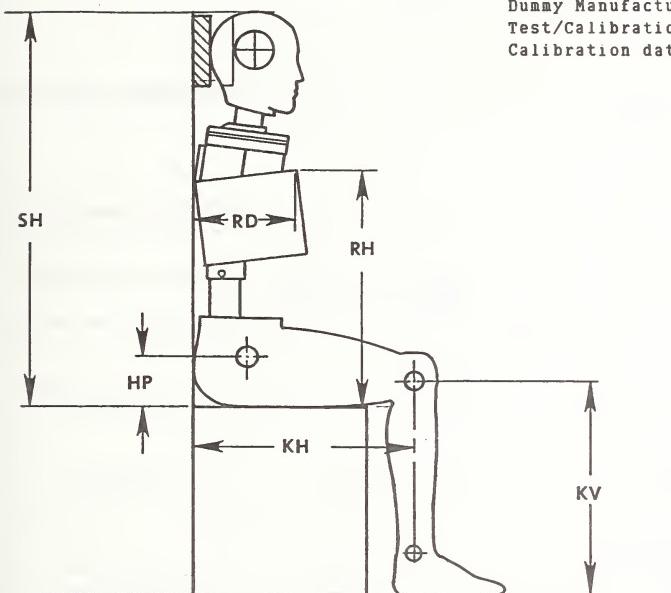


LEFT REAR PASSENGER DUMMY

DUMMY NO.: 905

SIDE IMPACT DUMMY CONFIGURATION TEST DATA

Dummy Serial No.: 905
Dummy Manufacturer: VRTC
Test/Calibration No.: CAL05
Calibration date: 04/22/91



NOTE: CHEST JACKET IS REMOVED FOR DISTANCE MEASUREMENTS AND IS INCLUDED FOR WEIGHT MEASUREMENT.

SIDE IMPACT DUMMY CONFIGURATION TEST DATA

SYB	DESCRIPTION	SPECIFICATION	MEASUREMENT
SH	SEATED HEIGHT	35.0 to 35.8	35.2
RH	RIB HEIGHT	19.75 to 20.50	19.8
HP	HIP PIVOT HEIGHT	3.9 REF	3.9
RD	RIB FROM BACKLINE	9.0 to 9.5	9.1
KH	KNEE PIVOT FROM BACKLINE	20.1 to 20.7	20.5
KV	KNEE PIVOT TO FLOOR	19.3 to 19.9	19.6
HW	HIP WIDTH	14.0 to 15.4	14.8
RW	RIB WIDTH FROM CENTERLINE - TOP*	6.5 to 7.1	6.6
RW	RIB WIDTH FROM CENTERLINE - BOTTOM	6.5 TO 7.1	6.6

*The difference between the top and bottom of the rib wrap should be no more than 0.1 inch.

ALL DISTANCE MEASUREMENTS ARE IN INCHES.

TRANSPORTATION RESEARCH CENTER OF OHIO

LATERAL THORAX IMPACT TEST

SIDE IMPACT DUMMY

09-May-91

LEFT SIDE CONFIGURATION

VRTC

ST90505

572F SN905 THORAX IMPACT CALOS

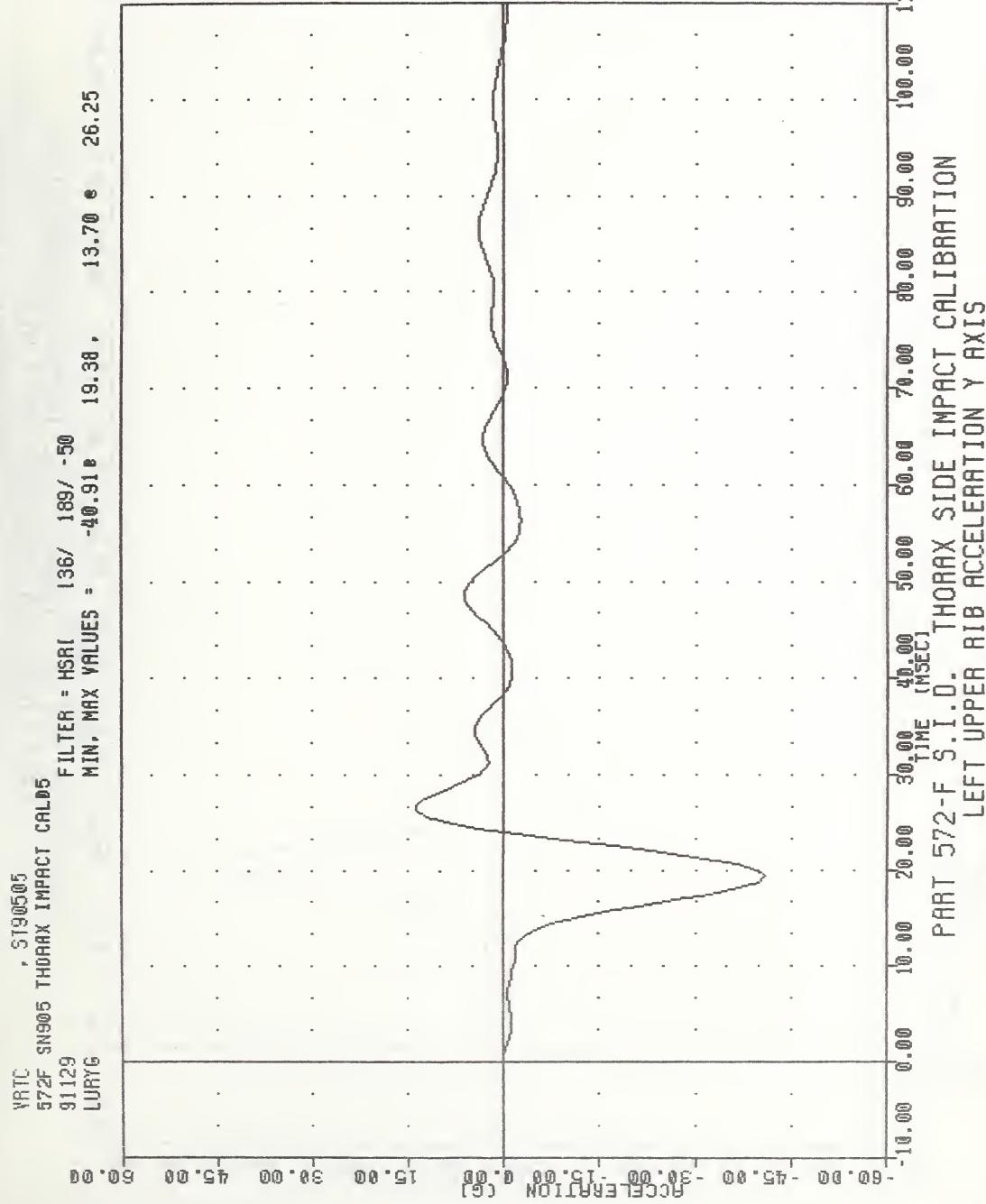
TEMPERATURE 74 F

RELATIVE HUMIDITY 48 %

TEST PARAMETER	SPECIFICATION (ABSOLUTE VALUE)	TEST RESULTS
PISTON VELOCITY	13.8 - 14.2 FT/S	14.0 FT/S
PEAK ACCELERATION: UPPER RIB BAR	37 - 46 G	-40.9 G
PEAK ACCELERATION: LOWER RIB BAR	37 - 46 G	-41.0 G
PEAK ACCELERATION: LOWER THORACIC SPINE	15 - 22 G	-18.8 G

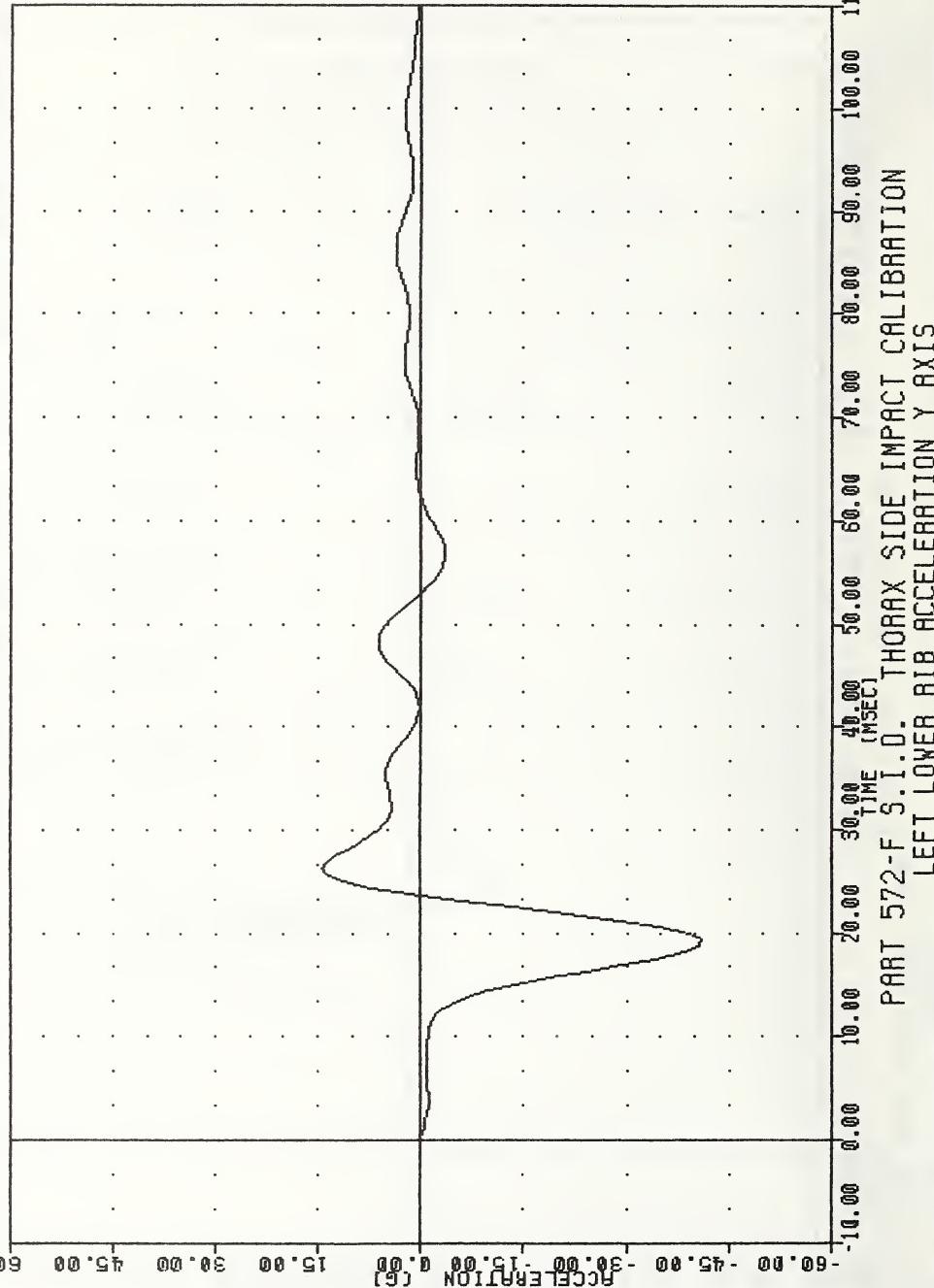
DUMMY MEETS SPECIFICATIONS

TECHNICIAN Clae Middleton

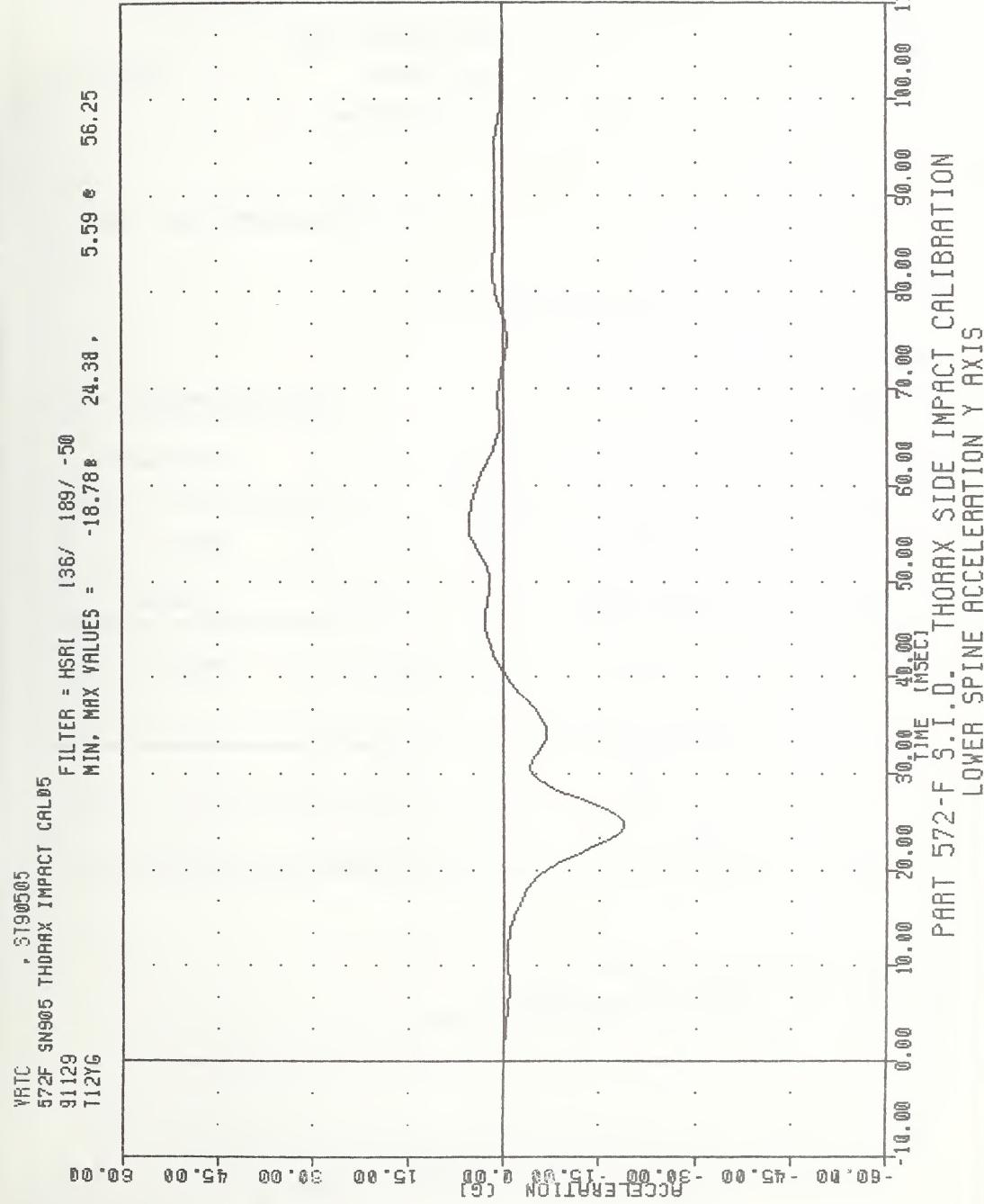


YRTC '572F SN905 THORAX IMPACT CAL05
91129 LLRY6

FILTER = HSRI 136/ 189/-50
MIN. MAX VALUES = -41.038 19.38 , 14.26 & 26.25



PART 572-F S.I.D. THORAX SIDE IMPACT CALIBRATION
LEFT LOWER RIB ACCELERATION Y AXIS



TRANSPORTATION RESEARCH CENTER OF OHIO

THORACIC SHOCK ABSORBER TESTS

SIDE IMPACT DUMMY

09-May-91

LEFT SIDE CONFIGURATION

VRTC

572F SN905 DAMPER TEST CAL05

TEST NOS. DP90505AZ, DP90505BZ, DP90505CZ

TEMPERATURE 72 F

RELATIVE HUMIDITY 48 %

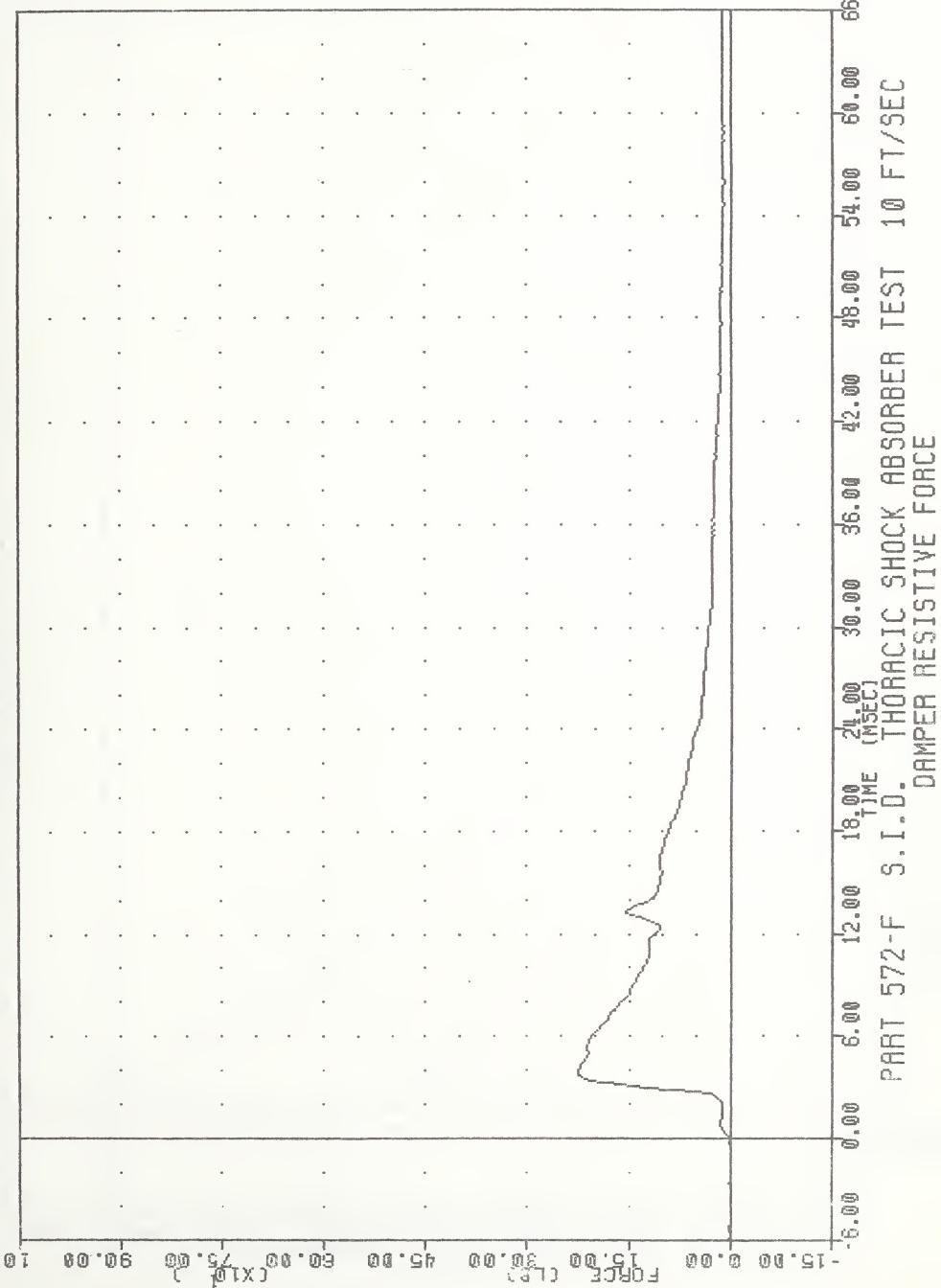
TEST PARAMETER		SPECIFICATION	TEST RESULTS
10.1 FT/S	FORCE	187 - 251 LB	226 LB
VELOCITY	DISPLACEMENT	1.18 - 1.38 IN	1.37 IN
14.4 FT/S	FORCE	413 - 508 LB	496 LB
VELOCITY	DISPLACEMENT	1.25 - 1.47 IN	1.47 IN
20.0 FT/S	FORCE	835 - 989 LB	955 LB
VELOCITY	DISPLACEMENT	1.31 - 1.56 IN	1.48 IN

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas Middleton

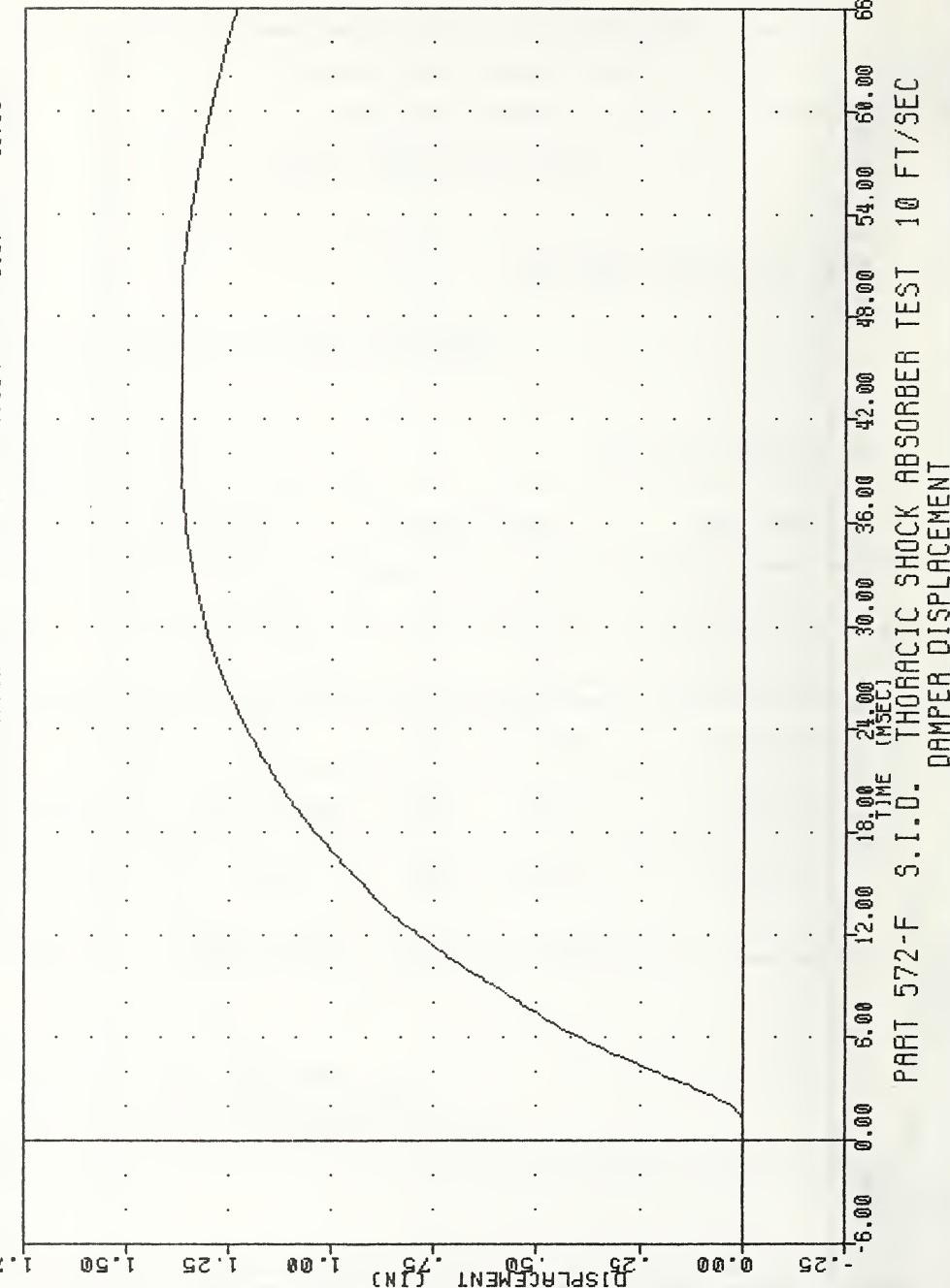
YRTC
572F SNS05 DAMPER TEST CAL05
91129
DAMPF

DP900505A
MIN, MAX VALUES = -0.038 , 226.46 e 3.88



VRTC 09905 DAMPER TEST CAL05
572F SN905 DAMPER TEST CAL05
91129 CSTID

FILTER = RLPF 1650/ 5214/-40
MIN., MAX VALUES = 0.000 , -6.00 ,
1.37 & 40.63

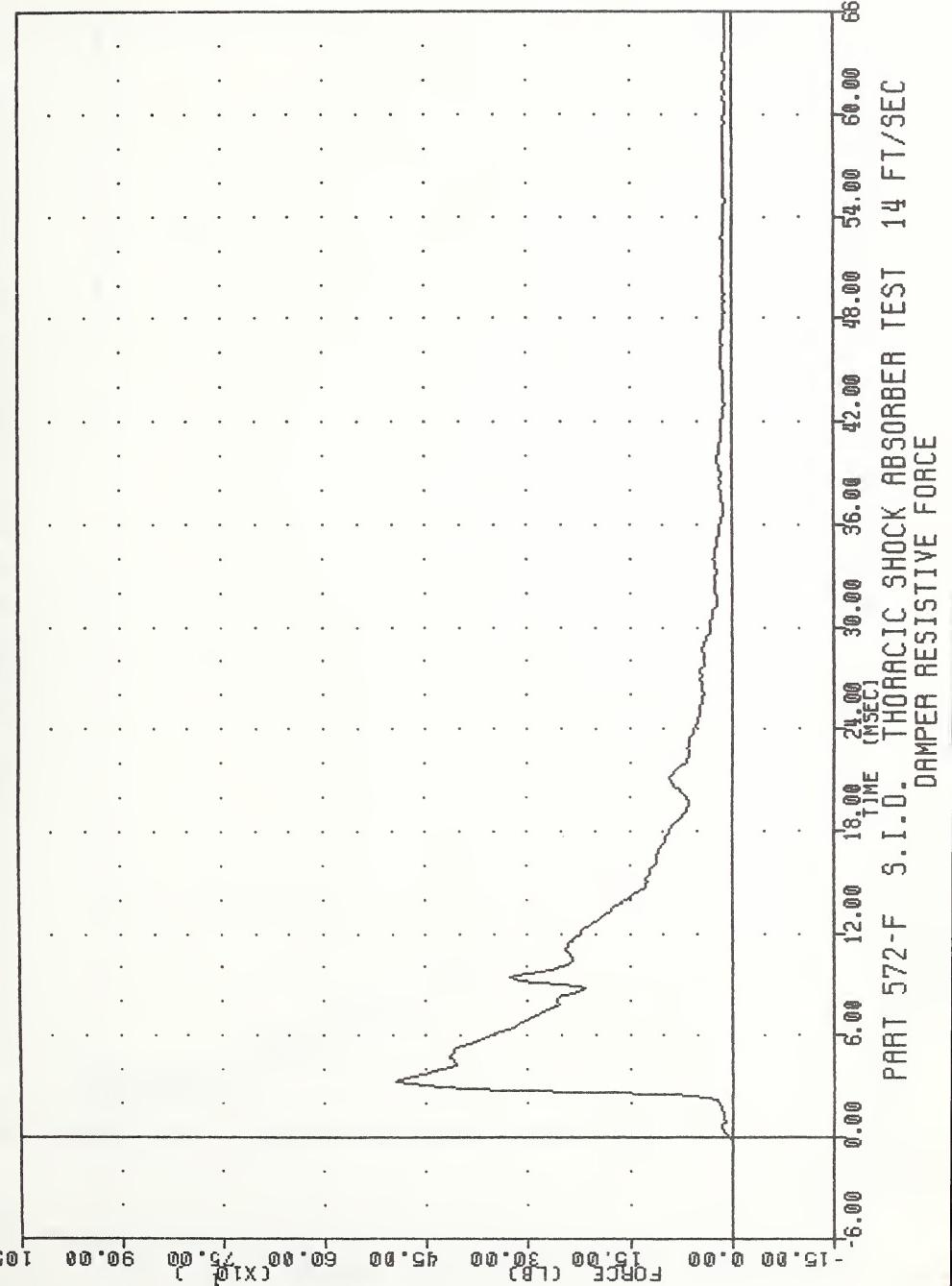


PART 572-F S.I.D. THORACIC SHOCK ABSORBER TEST 10 FT/SEC
DAMPER DISPLACEMENT

VRTC
572F SNS905 DAMPER TEST CAL05
91129
DAMPF

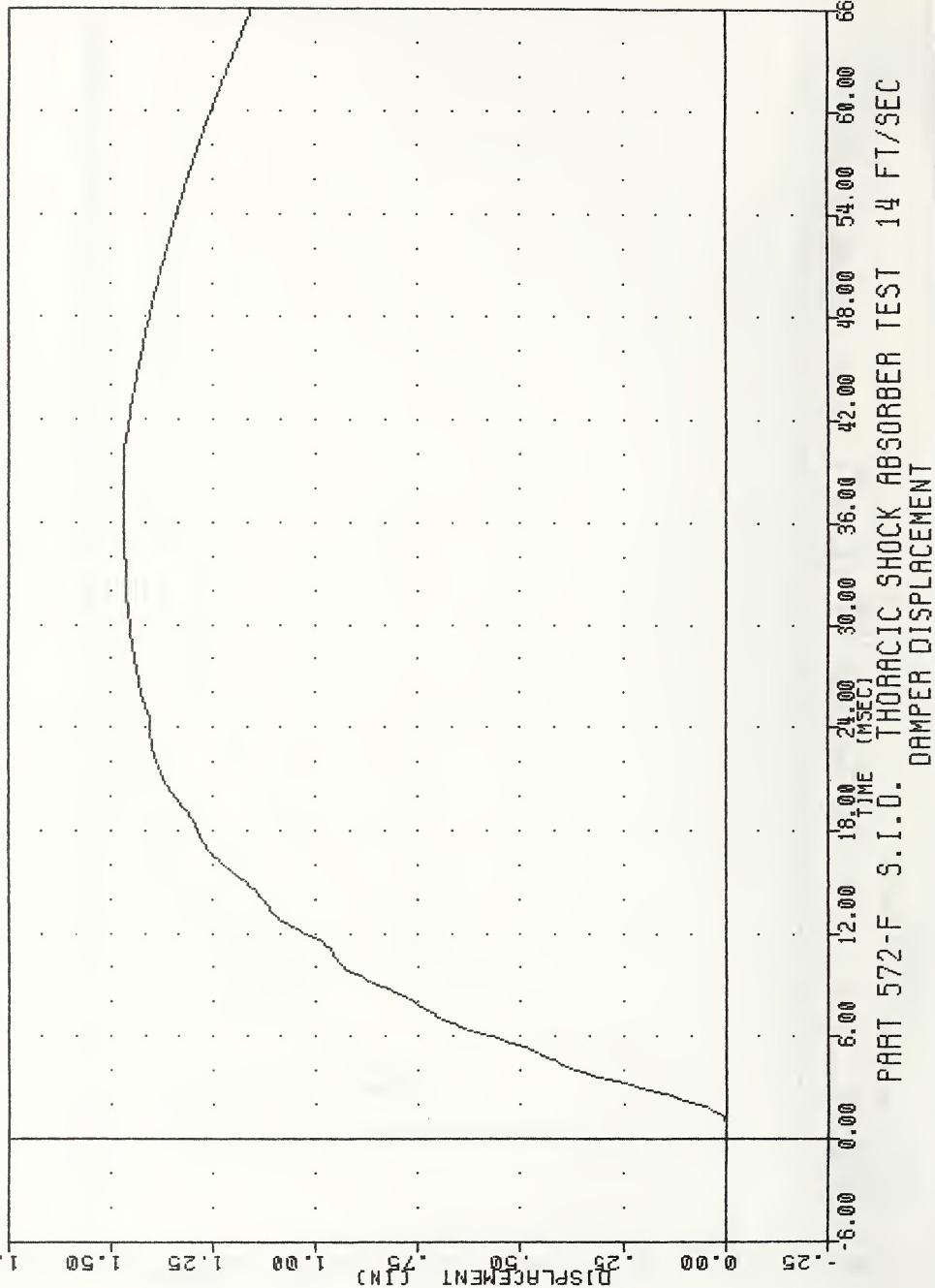
DP90505B
572F SNS905 DAMPER TEST CAL05
MIN. MAX VALUES = -0.948 - 5.75

3.25



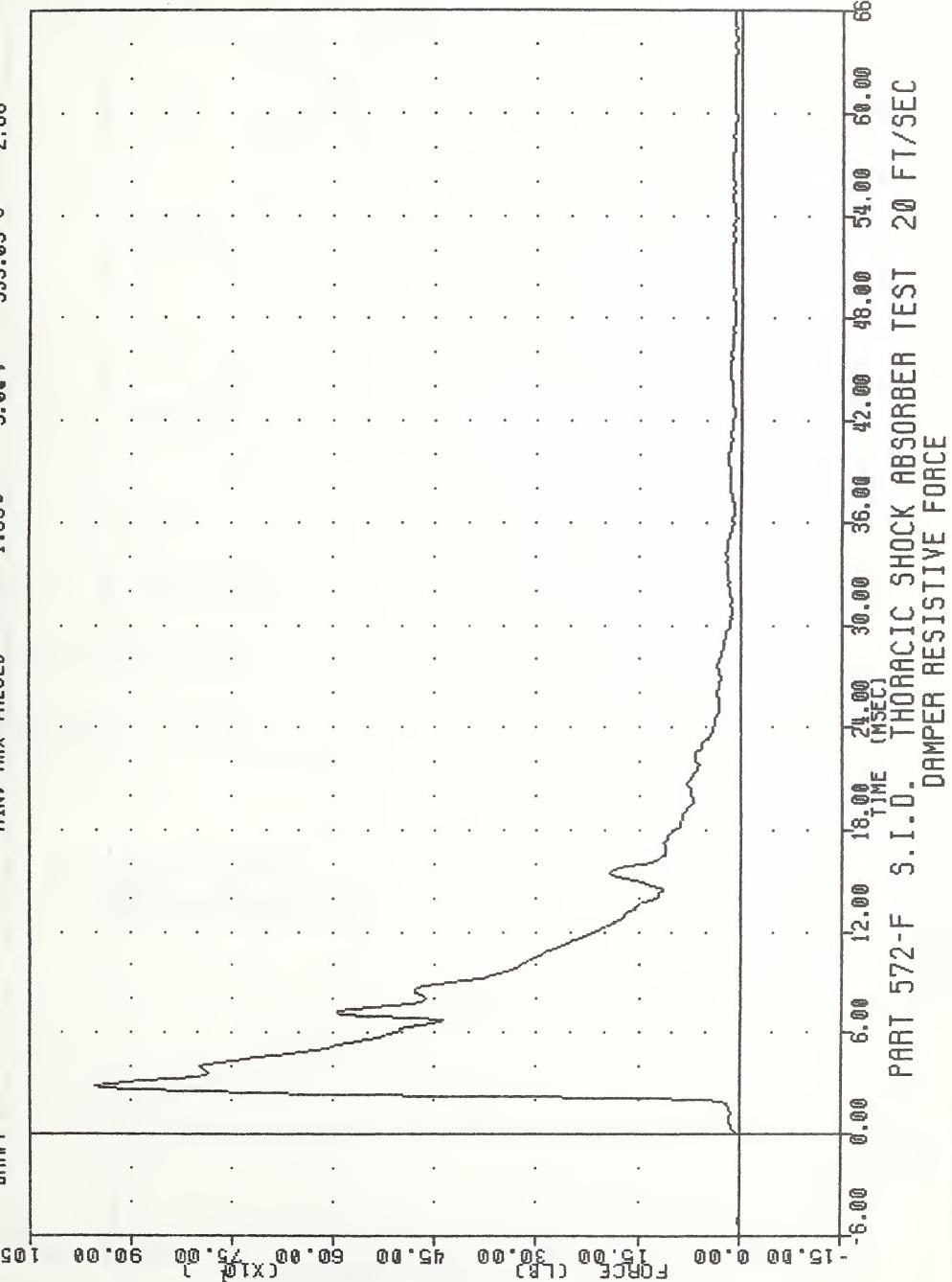
VRTC OF 9/05/58
572F SNS05 DAMPER TEST CAL05
91129 CSTYD

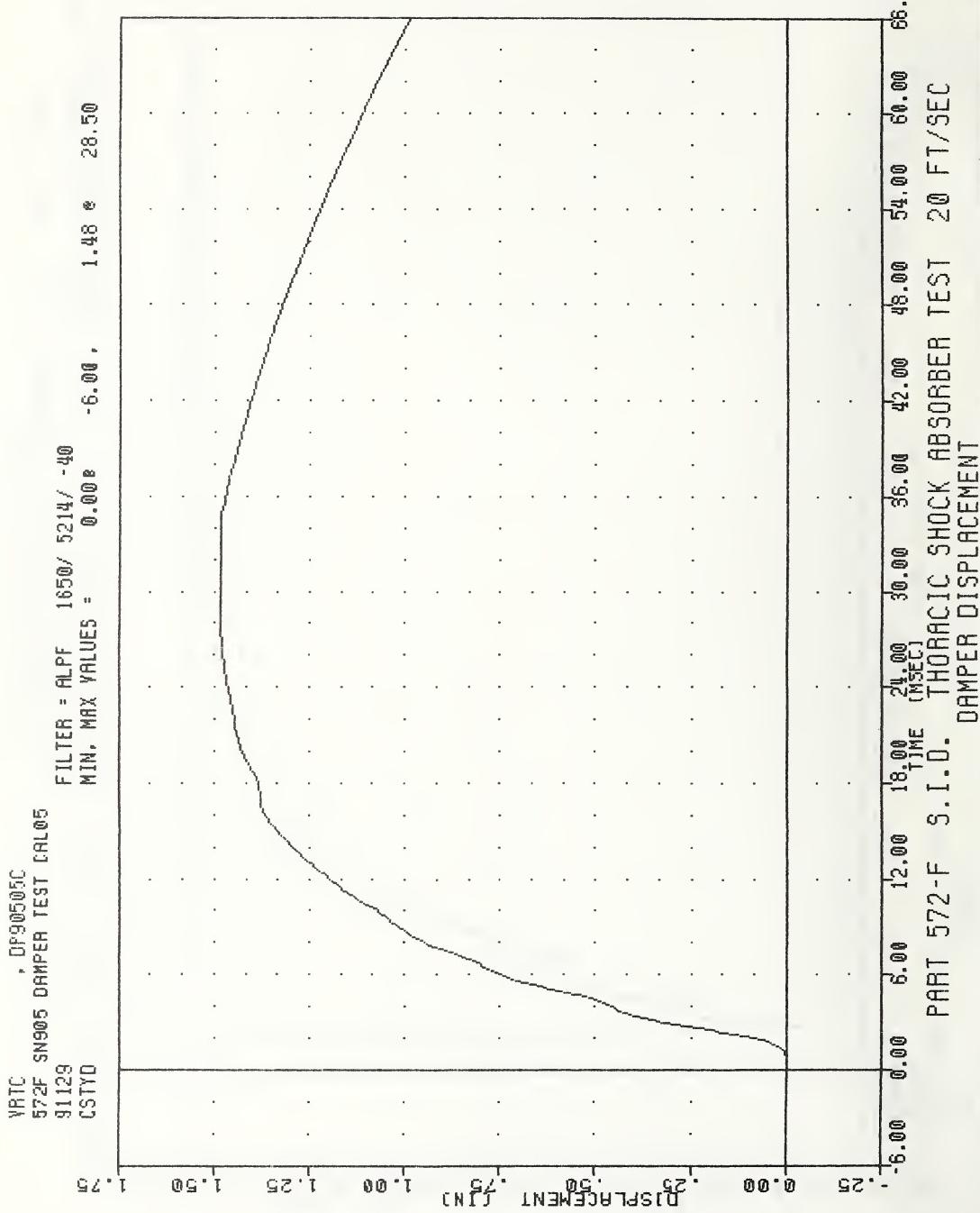
FILTER = ALPF 1650/ 5214/-40
MIN. MAX VALUES = 0.000 e -6.00 , -1.47 e 34.63



VRTC DP90505C
572F SNS905 DAMPER TEST CAL05
91129 DAMPF

MIN. MAX VALUES = -1.35E -3.00 , 955.03 E 2.88





TRANSPORTATION RESEARCH CENTER OF OHIO

LATERAL PELVIS IMPACT TEST

SIDE IMPACT DUMMY

13-May-91

LEFT SIDE CONFIGURATION

VRTC

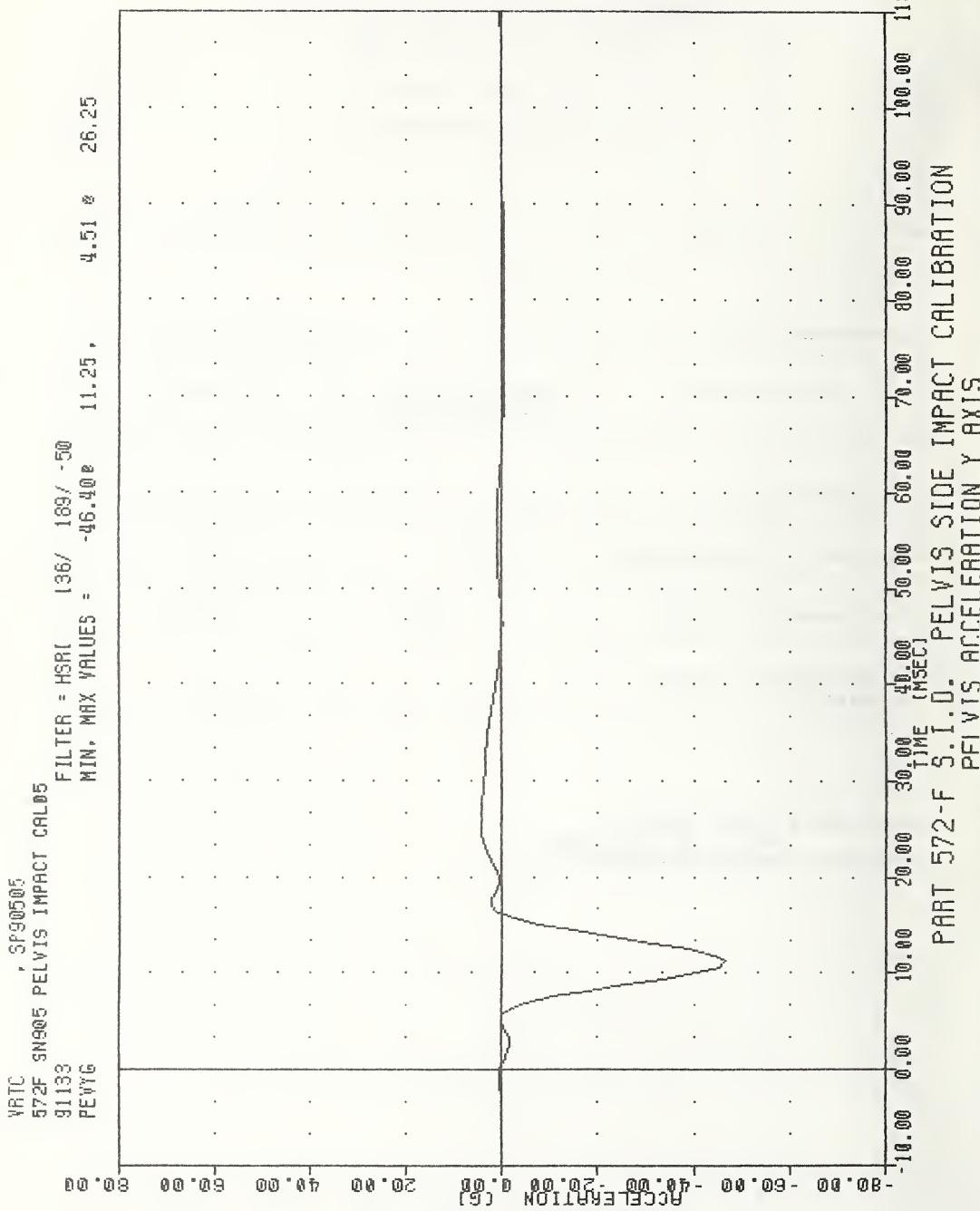
SP90505

572F SN905 PELVIS IMPACT CAL05

TEMPERATURE	74 F	RELATIVE HUMIDITY	65 %
TEST PARAMETER	SPECIFICATION	TEST RESULTS	
	(ABSOLUTE VALUE)		
PISTON VELOCITY	13.8 - 14.2 FT/S	13.8 FT/S	
PEAK PELVIC ACCELERATION	40 - 60 G	-46.4 G	
TIME ABOVE 20 G LEVEL	3 - 7 MSEC	5.7 MSEC	
IIS ACCELERATION CURVE UNIMODAL?	YES	YES	

DUMMY MEETS SPECIFICATIONS

TECHNICIAN Chas Middlelton



APPENDIX D

MISCELLANEOUS INFORMATION

DUMMY INSTRUMENTATION PLACEMENT
 DUMMY MANUFACTURER & S/N: HUMANETICS 002
 SEATING POSITION: DRIVER

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
HEDXG1	HEAD	X	ENDEVCO	7264	FC01J	FRONT
HEDYG1	HEAD	Y	ENDEVCO	7264	FG28J	LEFT
HEDZG1	HEAD	Z	ENDEVCO	7264	DF48J	UP
SHLYG1	LEFT SHOULDER	Y	ENDEVCO	7264	FG31J	UP
SHLYD1	LEFT SHOULDER					
	DISPLACEMENT		SPACE AGE CONTROLS	160321-H	62	
T01XG1	UPPER SPINE	X	ENDEVCO	7264	DC54J	REAR
T01YG1	UPPER SPINE	Y	ENDEVCO	7264	DC18J	LEFT
T01YGA	UPPER SPINE	Y	ENDEVCO	7264	FJ92J	RIGHT
T01ZG1	UPPER SPINE	Z	ENDEVCO	7264	FC43J	UP
T12XG1	LOWER SPINE	X	ENDEVCO	7264	FH37J	FRONT
T12YG1	LOWER SPINE	Y	ENDEVCO	7264	FF73J	LEFT
T12YGA	LOWER SPINE	Y	ENDEVCO	7264	FG43J	LEFT
T12ZG1	LOWER SPINE	Z	ENDEVCO	7264	DC20J	UP
LURYG1	LEFT UPPER RIB	Y	ENDEVCO	7264	DC68J	RIGHT
LURYGA	LEFT UPPER RIB	Y	ENDEVCO	7264	DE99J	RIGHT
LURYD1	LEFT UPPER RIB					
	DISPLACEMENT		SPACE AGE CONTROLS	160321-H	28	
LCRYG1	LEFT CENTER RIB	Y	ENDEVCO	7264	FF79J	RIGHT
LCRYGA	LEFT CENTER RIB	Y	ENDEVCO	7264	FC60J	RIGHT
LCRYD1	LEFT CENTER RIB					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	45	
LLRYG1	LEFT LOWER RIB	Y	ENDEVCO	7264	FG33J	RIGHT
LLRYGA	LEFT LOWER RIB	Y	ENDEVCO	7264	DC72J	RIGHT
LLRYD1	LEFT LOWER RIB					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	54	
LUAYG1	LEFT UPPER					
	ABDOMEN	Y	ENDEVCO	7264	ET91J	RIGHT
LUAYD1	LEFT UPPER ABDOMEN					
	DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	60	

DUMMY INSTRUMENTATION PLACEMENT CONTINUED
DUMMY MANUFACTURER & S/N: HUMANETICS 002
SEATING POSITION: DRIVER

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
LLAYG1	LEFT LOWER ABDOMEN	Y	ENDEVCO	7264	FB67J	RIGHT
LLAYD1	LEFT LOWER ABDOMEN DISPLACEMENT	Y	SPACE AGE CONTROLS	160321-H	109	
PEVXG1	PELVIS	X	ENDEVCO	7264	EW44J	FRONT
PEVYG1	PELVIS	Y	ENDEVCO	7264	FJ66J	RIGHT
PEVZG1	PELVIS	Z	ENDEVCO	7264	FG97J	UP

DUMMY INSTRUMENTATION PLACEMENT
 DUMMY MANUFACTURER & S/N: VRTC 905
 SEATING POSITION: LEFT REAR PASSENGER

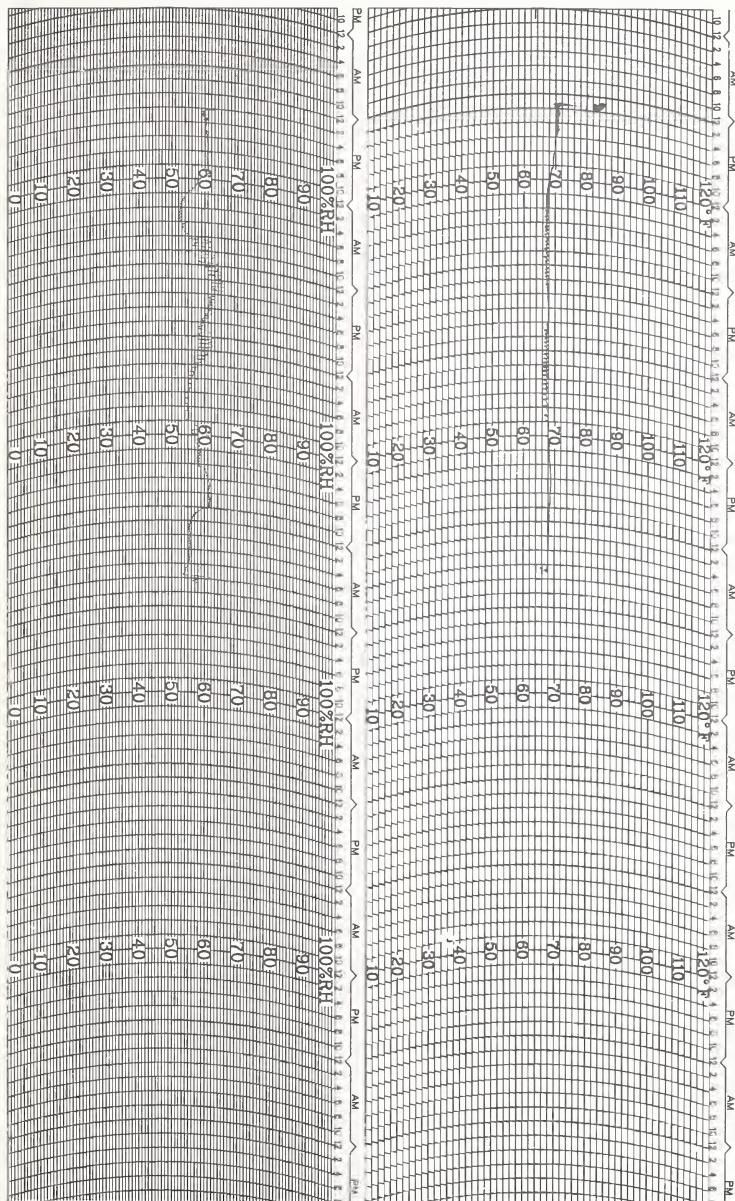
MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
HEDXG4	HEAD	X	ENDEVCO	7264	BP55J	REAR
HEDYG4	HEAD	Y	ENDEVCO	7264	BE62J	LEFT
HEDZG4	HEAD	Z	ENDEVCO	7264	BD91J	UP
T01XG4	UPPER SPINE	X	ENDEVCO	7264	BO98J	REAR
T01YG4	UPPER SPINE	Y	ENDEVCO	7264	DG87J	LEFT
T01ZG4	UPPER SPINE	Z	ENDEVCO	7264	EK16J	UP
T12XG4	LOWER SPINE	X	ENDEVCO	7264	EC41J	FRONT
T12YG4	LOWER SPINE	Y	ENDEVCO	7264	EH88J	LEFT
T12YGD	LOWER SPINE	Y	ENDEVCO	7264	EJ59J	LEFT
T12ZG4	LOWER SPINE	Z	ENDEVCO	7264	DE15J	UP
LURYG4	LEFT UPPER RIB Y		ENDEVCO	7264	EJ62J	RIGHT
LURYGD	LEFT UPPER RIB Y		ENDEVCO	7264	CA49H	RIGHT
LLRYG4	LEFT LOWER RIB Y		ENDEVCO	7264	EJ97J	RIGHT
LLRYGD	LEFT LOWER RIB Y		ENDEVCO	7264	BE69J	RIGHT
CSTYD4	CHEST					
	DISPLACEMENT	Y	BOURNS	5185	0483-280	
PEVXG4	PELVIS	X	ENDEVCO	7264	BH95J	REAR
PEVYG4	PELVIS	Y	ENDEVCO	7264	BD53J	LEFT
PEVZG4	PELVIS	Z	ENDEVCO	7264	BF11J	UP

VEHICLE INSTRUMENTATION PLACEMENT

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
RFSXG	RIGHT FRONT SILL	X	ENDEVCO	2264	AR38	FRONT
RFSYG	RIGHT FRONT SILL	Y	ENDEVCO	2264	AN45	LEFT
RFSZG	RIGHT FRONT SILL	Z	ENDEVCO	2264	AK21	UP
RRSXG	RIGHT REAR SILL	X	ENDEVCO	2264	BB60	REAR
RRSYG	RIGHT REAR SILL	Y	ENDEVCO	2264	AS06	LEFT
RRSZG	RIGHT REAR SILL	Z	ENDEVCO	2264	AS76	DOWN
RDKXG	REAR DECK	X	ENDEVCO	2264	AX88	REAR
RDKYG	REAR DECK	Y	ENDEVCO	2264	BA68	LEFT
RDKZG	REAR DECK	Z	ENDEVCO	2264	AV27	UP

VEHICLE INSTRUMENTATION PLACEMENT

MNEMONIC	LOCATION	AXIS	MFR	MODEL	S/N	ORIENTATION (+SENSING)
BCGXG	CENTER OF GRAVITY	X	ENDEVCO	2264	AS03	FRONT
BCGYG	CENTER OF GRAVITY	Y	ENDEVCO	2264	AS71	LEFT
BCGZG	CENTER OF GRAVITY	Z	ENDEVCO	2264	AR49	UP
BRCXG	REAR CROSSMEMBER	X	ENDEVCO	2264	AY13	REAR
BRCYG	REAR CROSSMEMBER	Y	ENDEVCO	2264	AS95	RIGHT



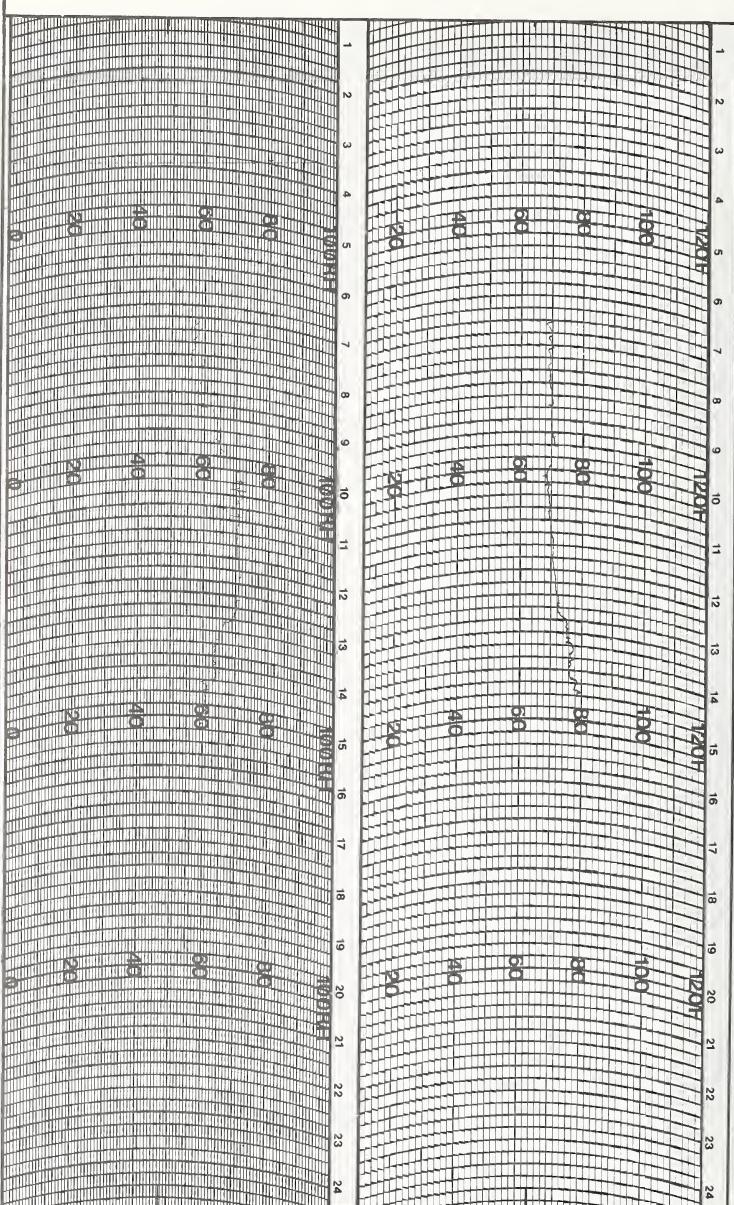
The logo for WeatherMeasure WEATHERtronics. It features a stylized mountain range graphic on the left, composed of horizontal bars of varying heights. To the right of the graphic, the word "WeatherMeasure" is written in a serif font, with "WEATHER" in a larger, bold, sans-serif font. Below this, the word "tronics" is written in a smaller, bold, sans-serif font. A horizontal line extends from the end of the "tronics" text across the page.

P.O. BOX 41039
SACRAMENTO, CA 95841
TELEPHONE: (916) 481-7565

HYGRO THERMOGRAPH

CHART NO. M699124
C311-W-HF
FCN 2563

STATION RSV Dunes DATE ON 5/17/91 DATE OFF 5/20/91



WEATHER MEASURE
P.O. BOX 41257
SACRAMENTO, CA. 95841
PHONE (916)481-7565

HYGROTHERMOGRAPH
1 DAY

CHART # C311 D HF
PART # 699123

STATION Minaret F SV DATE ON 5/20/01 DATE OFF 5/20/01

TL 242 "S"

Sankey, J

Evaluatio
dummy

Form DOT F 1
FORMERLY FORM

DOT LIBRARY



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